The 2010 “Research on Drug Evidence” Report
[From the 16th ICPO / INTERPOL Forensic Science Symposium]

Thomas M. Duncan
U.S. Department of Justice
Drug Enforcement Administration
Special Testing and Research Laboratory
22624 Dulles Summit Court
Dulles, VA 20166
[dea-microgram@usdoj.gov]

ABSTRACT: A reprint of the 2010 “Research on Drug Evidence” Report (a review) is provided.

KEYWORDS: INTERPOL, Illicit Drugs, Controlled Substances, Forensic Chemistry.

Important Information:

Presented at the 16th ICPO / INTERPOL Forensic Science Symposium, Lyon, France, October 5 - 8, 2010.

For pertinent background, see: Klein RFX. ICPO / INTERPOL Forensic Science Symposia, 1995 - 2016. “Research on Drug Evidence”. Prefacing Remarks (and a Request for Information). Microgram Journal 2016;13(1-4):1-3.

Citations in this report from the *Journal of the Clandestine Laboratory Investigating Chemists Association* were (and remain) Law Enforcement Restricted.

The "General Overview" (Talking Paper) was removed from this reprint (Editor's discretion).

This reprint is derived from the original electronic document, and is not an image of the best available hard copy (as was utilized for the 1995 and 1998 reports). For this reason, the pagination in the Proceedings is not retained in this reprint; in addition, minor corrections were made, (where present) "contact information" was removed, and some minor reformatting was done to eliminate deadspace. All widow and orphan lines were left as is. The references in this review were not numbered in the original document; in addition, in a few cases only the first page of the citation is provided (duplicating what was provided in the respective abstract). Finally, per request by the Symposium organizer, the journal titles were capitalized (and remain so in this reprint).

Research On Drug Evidence
July 1, 2007 - June 30, 2010

Presented by: Jeffrey H. Comparin

Prepared by: Thomas M. Duncan

U.S. Department of Justice
Drug Enforcement Administration

Office of Forensic Sciences
2401 Jefferson Davis Highway
Alexandria, Virginia 22301 USA

(Coordinating Office)

and

Special Testing and Research Laboratory
22624 Dulles Summit Court
Dulles, Virginia 20151 USA

(Coordinating Laboratory)

Sixteenth ICPO - INTERPOL
Forensic Sciences Symposium
October, 2010

Lyon, France

Table of Contents

Notes:

1. All categories are subdivided by topic or category, then alphabetically by the first author's last name.
2. Note that the following reference is law enforcement restricted, and is not available to the general public: The *Journal of the Clandestine Laboratory Investigating Chemists Association* (all years).

I) Routine and Improved Analysis of Abused Substances

Issue:

Improved methods of analysis, i.e., faster, more discriminatory, more sensitive, less costly, etc., are needed for all abused substances. Additionally, standard analytical data are required for previously unknown or rarely encountered substances and/or new homolog or analog (i.e., "designer"-type) drugs.

Solution:

Drug seizures and clandestine laboratory operations are continuously monitored to provide a comprehensive overview of new developments. Ongoing research in the forensic community, as well as in the general field of analytical chemistry, provide new and/or improved methods of analysis for both routine and specialized analyses of seized drugs. Reports providing standard analytical data for new drugs of abuse and/or improved analytical protocols for known drugs of abuse are generated for the forensic and enforcement communities.

References:

Reviews:

Bakouri E, Tsitsimpikou C, Tzifa R, Potamianos S, Tarli A, Vakka C, Pantilieri E. The general chemical state laboratory of Greece and its role in forensic drug analysis. TOXICOLOGY LETTERS 2008;180:S156-S157.

Bell S. Forensic chemistry. ANNUAL REVIEW OF ANALYTICAL CHEMISTRY 2009;2:297-319.

Berbatis CG, Sunderland VB, Dhaliwal SS. Linked electronic medication systems in community pharmacies for preventing pseudoephedrine diversion: A review of international practice and analysis of results in Australia. DRUG AND ALCOHOL REVIEW 2009;28(6):586-591.

Bjornsdottir I, Almarsdottir AB, Traulsen JM. The lay public's explicit and implicit definitions of drugs. RESEARCH IN SOCIAL & ADMINISTRATIVE PHARMACY 2009;5(1):40-50.

Bornmann L, Nast I, Daniel HD. Do editors and referees look for signs of scientific misconduct when reviewing manuscripts? A quantitative content analysis of studies that examined review criteria and reasons for accepting and rejecting manuscripts for

publication. SCIENTOMETRICS 2008;77(3):415-432.

Brettell TA, Butler JM, Almirall JR. Forensic science. ANALYTICAL CHEMISTRY 2009;81(12):4695-4711.

Caulkins JP. Price and purity analysis for illicit drug: Data and conceptual issues. DRUG AND ALCOHOL DEPENDENCE 2007;90:S61-S68.

Clark RL, Johnston BF, Mackay SP, Breslin CJ, Robertson MN, Sutcliffe OB, Dufton MJ, Harvey AL. The drug discovery portal: A computational platform for identifying drug leads from academia. CURRENT PHARMACEUTICAL DESIGN 2010;16(15):1697-1702.

Cody JT. Hallucinogens. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:175-201.

Daeid NN, Buchanan HAS, Savage KA, Fraser JG, Cresswell SL. Recent advances in the application of stable isotope ratio analysis in forensic chemistry. AUSTRALIAN JOURNAL OF CHEMISTRY 2010;63(1):3-7.

Fazey C. International policy on illicit drug trafficking: The formal and informal mechanisms. JOURNAL OF DRUG ISSUES 2007;37(4):755-779.

Fersht A. The most influential journals: Impact factor and Eigenfactor. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2009;106(17):6883-6884.

Gorun G, Ceausu M, Francisc A, Curca GC. Thanathogenesis due to inert chemical excipients in illicit drugs: Case report and literature review. ROMANIAN JOURNAL OF LEGAL MEDICINE 2008;16(3):181-186.

Holden C. Forensic science needs a major overhaul, panel says. SCIENCE 2009;323(5918):1155.

Houck MM. Foresight: A business approach to improving the nation's forensic laboratories. 2008 American Academy of Forensic Sciences Annual Meeting.

Hu C, Feng Y, Xue J, Chong X, Cheng S. Consideration and science development of the fast drug analysis system. YAOWU FENXI ZAZHI 2008;28(4):647-655.

Kasprzyk-Hordern B, Dinsdale RM, Guwy AJ. Illicit drugs and pharmaceuticals in the environment - Forensic applications of environmental data. Part 1: Estimation of the usage of drugs in local communities. ENVIRONMENTAL POLLUTION 2009;157(6):1773-1777.

Kasprzyk-Hordern B, Dinsdale RM, Guwy AJ. Illicit drugs and pharmaceuticals in the environment - Forensic applications of environmental data, Part 2: Pharmaceuticals as chemical markers of faecal water contamination. ENVIRONMENTAL POLLUTION 2009;157(6):1778-1786.

Kasprzyk-Hordern B, Dinsdale RM, Guwy AJ. The removal of pharmaceuticals, personal care products, endocrine disruptors and illicit drugs during wastewater treatment and its impact on the quality of receiving waters. WATER RESEARCH 2010;44(6):2076-2076.

Kolosov CA. Evaluating the public interest: Regulation of industrial hemp under the controlled substances act. UCLA LAW REVIEW 2009;57(1):237-274.

Leicach S, Margarita YG, Hugo C. Amines. RESEARCH METHODS IN PLANT SCIENCES: ALLELOPATHY 2009;7:291-314.

Liang BA, Mackey T. Searching for safety: Addressing search engine, website, and provider accountability for illicit online drug sales. AMERICAN JOURNAL OF LAW & MEDICINE 2009;35(1):125-184.

Marone P. Strengthening forensic science in the united states: A path forward. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

Maurer HH. Forensic analysis on the cutting edge - new methods for trace evidence analysis. JOURNAL OF THE AMERICAN SOCIETY FOR MASS SPECTROMETRY 2008;19(3):R1.

McCambridge J, Winstock A, Hunt N, Mitcheson L. Five year trends in use of hallucinogens and other adjunct drugs among UK dance drug users. EUROPEAN ADDICTION RESEARCH 2007;13(1):57-64.

McKetin R. The holy grail of supply control: Have we found the evidence? ADDICTION 2009;104(3):455-456.

Michels II, Fang YX, Zhao D, Zhao LY, Lu L. Comparison of drug abuse in Germany and China. ACTA PHARMACOLOGICA SINICA 2007;28:1505-1518.

Mionel O. The drug geopolitics in South America. METALURGIA INTERNATIONAL 2008;13(6):71-75.

Paoli L, Greenfield VA, Charles M, Reuter P. The global diversion of pharmaceutical drugs. ADDICTION 2009;104(3):347-354.

Paoli L, Rabkov I, Greenfield VA, Reuter P. Tajikistan: The rise of a narco-state. JOURNAL OF DRUG ISSUES 2007;37(4):951.

Poret S. An optimal anti-drug law enforcement policy. INTERNATIONAL REVIEW OF LAW AND ECONOMICS 2009;29(3):221-228.

Reid G, Devaney ML, Baldwin S. Drug production, trafficking and trade in Asia and Pacific Island countries. DRUG AND ALCOHOL REVIEW 2006;25(6):647-650.

Robertson J. Research front essay: Forensic chemistry. AUSTRALIAN JOURNAL OF CHEMISTRY 2010;63(1):1-2.

Sanderson K. Forensic labs warn of deuterated drug threat. NATURE 2009;458(7240):817

Storti CC, De Grauwe P. Globalization and the price decline of illicit drugs. INTERNATIONAL JOURNAL OF DRUG POLICY 2009;20(1):48-61.

Thevis M, Schaenzer W. Emerging drugs - Potential for misuse in sport and doping control detection strategies. MINI-REVIEWS IN MEDICINAL CHEMISTRY 2007;7(5):531.

Yasuda I, Takahashi M. Analysis of illegal drugs. BUNSEKI 2008(1):26-31.

Yasuda I. The identification of illegal drugs and the change of circulation products. TOKYO-TO KENKO ANZEN KENKYU SENTA KENKYU NENPO 2007;58:37-45.

Zwingenberger S, Pietsch J, Hommola A, Dressler J. Illegal drug-related deaths in East Germany between 1995 and 2004. FORENSIC SCIENCE INTERNATIONAL 2010;199(1-3):58-62.

Scientific Working Group for Forensic Analysis of Illicit Drugs:

Jackson LC. SWGDRUG update 2009. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

Santos NA. The Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG). 2008 American Academy of Forensic Sciences Annual Meeting.

Amphetamine (including substituted amphetamines), Methamphetamine, and Dimethylamphetamine (see Phenethylamines, and Methylenedioxyamphetamines):

Andreasen MF, Lindholst C, Kaa E. Adulterants and diluents in heroin, amphetamine, and cocaine found on the illicit drug market in Aarhus, Denmark. OPEN FORENSIC SCIENCE JOURNAL 2009;2:16-20.

Awad T, Belal T, DeRuiter J, Kramer K, Clark CR. Comparison of GC-MS and GC-IRD methods for the differentiation of methamphetamine and regioisomeric substances. FORENSIC SCIENCE INTERNATIONAL 2009;185(1-3):67-77.

Awad T, Clark CR, DeRuiter J. GC-MS analysis of acylated derivatives of the side-chain regioisomers of 4-methoxy-3-methyl-phenethylamines related to methylenedioxymeth-amphetamine. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2007;45(8):477-485.

Belal T, Awad T, Clark CR, DeRuiter J. GC-MS evaluation of a series of acylated derivatives of 3,4-methylenedioxymethamphetamine. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2009;47(5):359-364.

Bell SEJ, Fido LA, Sirimuthu NMS, Speers SJ, Peters KL, Cosbey SH. Screening tablets for DOB using surface-enhanced Raman spectroscopy. JOURNAL OF FORENSIC SCIENCES 2007;52(5):1063-1067.

Bijlsma L, Sancho JV, Pitarch E, Ibanez M, Hernandez F. Simultaneous ultra-high-pressure liquid chromatography-tandem mass spectrometry determination of amphetamine and amphetamine-like stimulants, cocaine and its metabolites, and a cannabis metabolite in surface water and urban wastewater. JOURNAL OF CHROMATOGRAPHY A 2009;1216(15):3078-3089.

Blachut D, Wojtasiewicz K, Czarnocki Z, Szukalski B. The analytical profile of some 4-methylthioamphetamine (4-MTA) homologues. FORENSIC SCIENCE

INTERNATIONAL 2009;192(1-3):98-114.

Boles TH, Wells MJM. Analysis of amphetamine and methamphetamine as emerging pollutants in wastewater and wastewater-impacted streams. JOURNAL OF CHROMATOGRAPHY A 2010;1217(16):2561-2568.

Bozenko JS. Clandestine enantiomeric enrichment of d-methamphetamine via tartaric acid resolution. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(3):4.

Callaghan RC, Cunningham JK, Victor JC, Liu LM. Impact of Canadian federal methamphetamine precursor and essential chemical regulations on methamphetamine-related acute-care hospital admissions. DRUG AND ALCOHOL DEPENDENCE 2009;105(3):185-193.

Chiadmi F, Schlatter J. Crystal meth: A particular form of methamphetamine. PRESSE MEDICALE 2009;38(1):63-67.

Chintalova-Dallas R, Case P, Kitsenko N, Lazzarini Z. Boltushka: A homemade amphetamine-type stimulant and HIV risk in Odessa, Ukraine. INTERNATIONAL JOURNAL OF DRUG POLICY 2009;20(4):347-351.

Chung LW, Lin KL, Yang TCC, Lee MR. Orthogonal array optimization of microwave-assisted derivatization for determination of trace amphetamine and methamphetamine using negative chemical ionization gas chromatography-mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2009;1216(18):4083-4089.

Cody JT. Amphetamines. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:127-174.

Coxon A, Mills S. Tackling methamphetamine in New Zealand. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(1):9.

Cunningham JK, Liu LM, Callaghan R. Impact of US and Canadian precursor regulation on methamphetamine purity in the United States. ADDICTION 2009;104(3):441-453.

Cunningham JK, Liu LM. Impact of methamphetamine precursor chemical legislation, a suppression policy, on the demand for drug treatment. SOCIAL SCIENCE &

MEDICINE 2008;66(7):1463-1473.

Diozan D, Baheri T, Pournaghi-Azar MH. Development of electro solid-phase microextraction and application to methamphetamine analysis. CHROMATOGRAPHIA 2007;65(1-2):45.

Dobkin C, Nicosia N. The war on drugs: Methamphetamine, public health, and crime. AMERICAN ECONOMIC REVIEW 2009;99(1):324-349.

Fu Q, Liao L-c, Chen L-l, Yan Y-y, Yang L, Hou J-h, Chen Y. Detecting methamphetamine and amphetamine with high performance liquid chromatography. SICHUAN DAXUE XUEBAO, YIXUEBAN 2007;38(6):1025-1028.

Goh CY, van Bronswijk W, Priddis C. Rapid nondestructive on-site screening of methylamphetamine seizures by attenuated total reflection Fourier transform infrared spectroscopy. APPLIED SPECTROSCOPY 2008;62(6):640-648.

Gosav S, Dinica R, Praisler M. Choosing between GC-FTIR and GC-MS spectra for an efficient intelligent identification of illicit amphetamines. JOURNAL OF MOLECULAR STRUCTURE 2008;887(1-3):269-278.

Gosav S, Praisler M, Dorohoi DO. ANN expert system screening for illicit amphetamines using molecular descriptors. JOURNAL OF MOLECULAR STRUCTURE 2007;834:188-194.

Inoue H, Kuwayama K, Iwata YT, Kanamori T, Tsujikawa K, Miyaguchi H. Simple and simultaneous detection of methamphetamine and dimethyl sulfone in crystalline methamphetamine seizures by fast gas chromatography. FORENSIC TOXICOLOGY 2008;26(1):19-22.

Kim JY, In MG, Jung JC, Ko BJ. Method for simultaneously analyzing dimethylamphetamine and amphetamine derivatives by using liquid chromatography. Republic of Korea KR 902,571.

Kubicz EJ, Allen L. Studies on methamphetamine detection with Drugwipe analytical device, part 2. 2008 American Academy of Forensic Sciences Annual Meeting.

Lamb PB, McElhinny CJ, Sninski T, Purdom H, Carroll FI, Lewin AH. High specific activity (+)-amphetamine and (+)-methamphetamine. JOURNAL OF LABELLED

COMPOUNDS & RADIOPHARMACEUTICALS 2009;52(11-12):457-462.

Martinez FS, Roesch DM, Jacobs JL. Isolation of methamphetamine from 1-(1',4'-cyclo-hexadienyl)-2-methylaminopropane using potassium permanganate. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):18.

Martinez, FS, Roesch DM, and Jacobs JL. Isolation of methamphetamine from 1-(1',4'-cyclohexadienyl)-2-methylaminopropane. MICROGRAM JOURNAL 2008;6(1-2):46.

Matchett CC, Pietrucha TL. Investigation of mothballs as a counterfeit for "ice" methamphetamine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(2):10.

Matsushita T, Takatsu M, Yoshida Y, Moriyasu M. Development of new on-column chiral derivatization reagent for gas chromatographic separation of optical isomeric amphetamine and methamphetamine. BUNSEKI KAGAKU 2007;56(12):1089-1095.

McKetin R. Methamphetamine precursor regulation: Are we controlling or diverting the drug problem? ADDICTION 2008;103(4):521-523.

Nevescanin M, Stevic SB, Petrovic S, Vajs V. Analysis of amphetamines illegally produced in Serbia. JOURNAL OF THE SERBIAN CHEMICAL SOCIETY 2008;73(7):691-701.

Pavlova V, Petrovska-Jovanovic S. Simultaneous determination of amphetamine, methamphetamine, and caffeine in seized tablets by high-performance liquid chromatography. ACTA CHROMATOGRAPHICA 2007;18:157.

Romero GM, Chianella I, Piletska EV, Karim K, Turner APF, Piletsky SA. Development of a piezoelectric sensor for the detection of methamphetamine. ANALYST 2009;134(8):1565-1570.

Sachs SB, Woo F. A detailed mechanistic fragmentation analysis of methamphetamine and select regioisomers by GC/MS. JOURNAL OF FORENSIC SCIENCES 2007;52(2):308-319.

Sanderson R. Identification of N-methylbenzlamine hydrochloride, N-ethylbenzylamine

hydrochloride, and N-isopropylbenzylamine hydrochloride. MICROGRAM JOURNAL 2008;6(1-2):36.

Shahdousti P, Aghai-Nohammadi M, Alizadeh N. Spectrophotometric study of the charge-transfer and ion-pair complexation of methamphetamine with some acceptors. SPECTROCHIMICA ACTA PART A-MOLECULAR AND BIOMOLECULAR SPECTROSCOPY 2008;69(4):1195-1200.

Smith JP, Martin A, Sammons DL, Striley C, Biagini R, Quinn J, Cope R, Snawder JE. Measurement of methamphetamine on surfaces using surface plasmon resonance. TOXICOLOGY MECHANISMS AND METHODS 2009;19(6-7):416-421.

Steiner RR. A rapid technique for the confirmation of iodine and red phosphorus using direct analysis in real time and accurate mass spectrometry. MICROGRAM JOURNAL 2010;7(1):3-6.

Sugita R, Sasagawa K, Suzuki S. Illegal route estimation of the seized illicit drug, methamphetamine, by the comparison of striation marks on plastic packaging films. JOURNAL OF FORENSIC SCIENCES 2009;54(6):1341-1348.

Tsujikawa K, Kuwayama K, Miyaquchi H, Kanamori T, Iwata YT, Yoshida T, Inoue H. Development of an on-site screening system for amphetamine-type stimulant tablets with a portable attenuated total reflection Fourier transform infrared spectrometer. ANALYTICA CHIMICA ACTA 2008;608(1):95-103.

Wang H, Jia J, Cao J, Wang Y. Simultaneous determination of methamphetamine, caffeine and ketamine by GC/MS. SHANXI YIKE DAXUE XUEBAO 2007;38(11):1013-1016,1023.

Watanabe-Galloway S, Ryan S, Hansen K, Hullsiek B, Muli V, Malone AC. Effects of methamphetamine abuse beyond individual users. JOURNAL OF PSYCHOACTIVE DRUGS 2009;41(3):241-248.

Wei T, Hao H, Liu J, Zhu J, Yu, Z. Sensitive biosensor chip for recognizing methamphetamine, and method for manufacturing said biosensor chip. APPLICATION: CN 2010-118987 11 Mar 2009.

Yohannan M. Detection of phenethylamine, amphetamine, and tryptamine imine by-products from an acetone extraction. Mid-Atlantic Association of Forensic Scientists

Annual Meeting: 2009.

Zaitsu K, Katagi M, Kamata H, Kamata T, Shima N, Miki A, Iwamura T, Tsuchihashi H. Discrimination and identification of the six aromatic positional isomers of trimethoxy-amphetamine (TMA) by gas chromatography-mass spectrometry (GC-MS). JOURNAL OF MASS SPECTROMETRY 2008;43(4):528-534.

Zhang LL, Chen Y, Lin M, Fan GR, Zhao WQ, Wu YT. Fast CE determination of d-amphetamine and diphenhydramine in quick-acting anti-motion capsules. CHROMATOGRAPHIA 2007;65(5-6):305.

Barbiturates (including Quaaludes):

Kuila DK, Lahiri SC. Study of hydrogen bonding interactions of methaqualone with alcohols, naphthols and nitrophenols. JOURNAL OF THE INDIAN CHEMICAL SOCIETY 2008;85(8):830-835.

Pilau EJ, Silva RGC, Jardim ICFS, Augusto F. Molecularly imprinted sol-gel silica for solid phase extraction of phenobarbital. JOURNAL OF THE BRAZILIAN CHEMICAL SOCIETY 2008;19(6):1136-43.

Ray R, Sharma JD, Limaye SN. Variations in the physico-chemical parameters of some N-methyl substituted barbiturate derivatives. ASIAN JOURNAL OF CHEMISTRY 2007;19(5):3382.

Shabir GA, Bradshaw TK, Arain SA, Shar GQ. A new validated method for the simultaneous determination of a series of eight barbiturates by RP-HPLC. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2010;33(1):61-71.

Benzodiazepines:

Acikkol M, Mercan S, Karadayi S. Simultaneous determination of benzodiazepines and ketamine from alcoholic and nonalcoholic beverages by GC-MS in drug facilitated crimes. CHROMATOGRAPHIA 2009;70(11-12):1769-1770.

Acikkol M, Mercan S, Karadayi S. Simultaneous determination of benzodiazepines and ketamine from alcoholic and nonalcoholic beverages by GC-MS in drug facilitated crimes. CHROMATOGRAPHIA 2009;70(7-8):1295-1298.

Bishop SC, Lerch M, McCord BR. Detection of nitrated benzodiazepines by indirect laser-induced fluorescence detection on a microfluidic device. JOURNAL OF CHROMATOGRAPHY A 2007;1154(1-2):481-484.

Brettell TA, Asselin EL. Presumptive and confirmatory identification of 1,2-triazolo-benzodiazepines. 2008 American Academy of Forensic Sciences Annual Meeting.

Daundkar BB, Malve MK, Krishnamurthy R. A specific chromogenic reagent for detection of diazepam among other benzodiazepines from biological and nonbiological samples after HPTLC. JOURNAL OF PLANAR CHROMATOGRAPHY-MODERN TLC 2008;21(4):249-250.

Du H, Ge H, Yu L, Wang X. Fast detection of clonazepam mixed illegally in traditional Chinese medicine by TLCS. ZHONGGUO YAOSHI 2007;10(9):891.

Guthery B, Bassindale A, Pillinger CT, Morgan GH. The detection of various opiates and benzodiazepines by comprehensive two-dimensional gas chromatography/time-of-flight mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(3):340-348.

Honeychurch KC. Determination of flunitrazepam and nitrazepam in beverage samples by liquid chromatography with dual electrode detection using a carbon fibre veil electrode. JOURNAL OF SOLID STATE ELECTROCHEMISTRY 2008;12(10):1317-1324.

Ishida T, Kudo K, Hayashida M, Ikeda N. Rapid and quantitative screening method for 43 benzodiazepines and their metabolites, zolpidem and zopiclone in human plasma by liquid chromatography/mass spectrometry with a small particle column. JOURNAL OF CHROMATOGRAPHY B - ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2009;877(25):2652-2657.

Janowska E, Adamowicz P, Chudzikiewicz E, Lechowicz W. Clonazepam - A drug used for medical and criminal purposes. Z ZAGADNIEN NAUK SADOWYCH 2007;71:297-302.

Koba M, Koba K, Baczek T. Determination of oxazepam in pharmaceutical formulation by HPTLC UV-densitometric and UV-derivative spectrophotometry methods. ANALYTICAL LETTERS 2009;42(12):1831-1843.

McGuire ND, Honeychurch KC, Hart, JP. The electrochemical behavior of nitrazepam at a screen-printed carbon electroge and its determination in beverages by adsorptive stripping voltammetry. ELECTROANALYSIS 2009;21(19):2165-2170.

Sarwar M, Taylor S, Majeed I. A specific screening color test for diazepam. MICROGRAM JOURNAL 2008;6(3-4):63.

Webb R, Doble P, Dawson M. A rapid CZE method for the analysis of benzodiazepines in spiked beverages. ELECTROPHORESIS 2007;28:3553-3565.

Dimethoxyphenethylamines:

da Costa JL, Wang AY, Micke GA, Maldaner AO, Romano RL, Martins HA, Negrini O, Tavares MFM. Chemical identification of 2,5-dimethoxy-4-bromoamphetamine (DOB). FORENSIC SCIENCE INTERNATIONAL 2007;173:130-136.

Franck MC, Meneghini LZ, Rossato LG, Limberger RP, Froehlich PE. Development and validation of an LC-UV method for quantitation of 4-bromo-2,5-dimethoxyamphetamine (DOB), 4-bromo-2,5-dimethoxyphenetylamine (2C-B), methylphenidate, fenproporex and amfepramone. CHROMATOGRAPHIA 2009;69(Suppl. 2):143-148.

Luiz da Costa J, Wang AY, Micke GA, Maldaner AO, Romano RL, Martins-Junior HA, Negrini O, Tavares MFM. Chemical identification of 2,5-dimethoxy-4-bromoamphetamine (DOB). FORENSIC SCIENCE INTERNATIONAL 2007;173(2-3):130.

Maher HM, Awad T, DeRuiter J, Clark CR. GC-MS and GC-IRD studies on dimethoxyamphetamines (DMA): Regioisomers related to 2,5-DMA. FORENSIC SCIENCE INTERNATIONAL 2009;192(1-3):115-125.

Suzuki J, Takahashi M, Nagashima M, Seto T, Mori K, Ogino S. Identification of 2,4,5-trichloro-3,6-dimethoxyphenethylamine detected in illegal drugs by the chemical synthesis. TOKYO-TO KENKO ANZEN KENKYU SENTA KENKYU NENPO 2009;59:85-89.

Trachsel D, Nichols DE, Kidd S, Hadorn M, Baumberger F. 4-Aryl-substituted 2,5-dimethoxyphenethylamines: Synthesis and serotonin 5-HT2A receptor affinities. CHEMISTRY & BIODIVERSITY 2009;6(5):692-704.

Xu YZ, Lin HR, Lua AC, Chen C. Determination of dimethoxyphenethylamine

derivatives in urine by deuterium labeled internal standards. JOURNAL OF THE SERBIAN CHEMICAL SOCIETY 2008;73(12):1223-1233.

Xu YZ, Lin HR, Lua CA, Chen CP. Synthesis of deuterium labeled (+/-)-2,5-dimethoxy-amphetamine (DMA), (+/-)-4-bromo-2,5-dimethoxyamphetamine (DOB), and (+/-)-4-methoxyamphetamine (PMA) as internal standards for quantitative analyses by GC-MS. JOURNAL OF THE CHINESE CHEMICAL SOCIETY 2007;54(2):493-502.

Chlordiazepoxide:

Bakal RL, Manwar JV, Sahare AY, Bhajipale NS, Manikrao AM. Spectrophotometric estimation of amitriptyline HCl and chlordiazepoxide in pharmaceutical dosage form. INDIAN JOURNAL OF PHARMACEUTICAL EDUCATION AND RESEARCH 2008;42(1):23-26.

Jouyban A, Shokri J, Barzegar-Jalali M, Hassanzadeh D, Acree WE, Ghafourian T, Nokhodchi A. Solubility of chlordiazepoxide, diazepam, and lorazepam in ethanol plus water mixtures at 303.2 K. JOURNAL OF CHEMICAL AND ENGINEERING DATA 2009;54(7):2142-2145.

Ozdemir A, Keskin CS. Quantification of chlordiazepoxide and pipenzolate bromide in tablets and comparison with chromatographic results. ASIAN JOURNAL OF CHEMISTRY 2009;21(2):1159-1170.

Patel S, Patel NJ, Patel SA. Simultaneous spectrophotometric estimation of imipramine hydrochloride and chlordiazepoxide in tablets. INDIAN JOURNAL OF PHARMACEUTICAL SCIENCES 2009;71(4):468-U198.

Patel S, Patel NJ. Spectrophotometric and chromatographic simultaneous estimation of amitriptyline hydrochloride and chlordiazepoxide in tablet dosage forms. INDIAN JOURNAL OF PHARMACEUTICAL SCIENCES 2009;71(4):472-U203.

Patel SK, Patel NJ. Simultaneous RP-HPLC estimation of trifluoperazine hydrochloride and chlordiazepoxide in tablet dosage forms. INDIAN JOURNAL OF PHARMACEUTICAL SCIENCES 2009;71(5):545-547.

Sarrafi AHM, Khodakarami Z, Karkeabadi M. Simultaneous spectrophotometric determination of amitriptyline hydrochloride and chlordiazepoxide in pharmaceutical tablets by multivariate calibration method. E-JOURNAL OF CHEMISTRY

2009;6:S111-S116.

Clenbuterol:

Jiao F, Chen X, Hu Y, Wang Z. Enantiomeric separation of racemic clenbuterol by capillary zone electrophoresis. JOURNAL OF THE IRANIAN CHEMICAL SOCIETY 2008;5(4):553-558.

Mostafa GAE Hefnawy MM El-Majed A. Separation and determination of clenbuterol by HPLC using a vancomycin chiral stationary phase. JOURNAL OF AOAC INTERNATIONAL 2009;92(3):824-829.

Parr MK, Koehler K, Geyer H, Guddat S, Schanzer W. Clenbuterol marketed as dietary supplement. BIOMEDICAL CHROMATOGRAPHY 2008;22(3):298-300.

Cocaine:

Aehle E, Drager B. Tropane alkaloid analysis by chromatographic and electrophoretic techniques: An update. JOURNAL OF CHROMATOGRAPHY B-ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2010;878(17-18):1391-1406.

Anonymous. Washington, DC, USA, proves to be cocaine capital of the world. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2009;28(9):5-6.

Bonilla DA, Penuela LF, Sierra N, Diaz JE, Rojas JH. Development and validation of an analytical methodology for cocaine hydrochloride determination in a synthetic polymer by ultraviolet spectrometry. VITAE 2008;15(1):103-12.

Borges F, Cordeiro M, Mosquera RA, Natalia DS,Rincon DA. Theoretical study of cocaine and ecgonine methyl ester in gas phase and in aqueous solution. CHEMICAL PHYSICS LETTERS 2009;467(4-6):249-254.

Boudreau DK, Casale JF. An in-depth study of the Peruvian base llavada ("washed base") technique for purification of crude cocaine base. MICROGRAM JOURNAL 2008;6(3-4):72.

Brackney M, Baumbach J, Ewers C, Martinez AL, Hagan J, Czuchlewski D, Foucar K, Fekrazad MH, Seifert SA, Dimple D, Nolte KB, Buchanan JA, Lavonas Nelson C, Wood

RW, Duchin JS, VanEenwyk J, Reuter N, Ta ML, Vagi S. Agranulocytosis associated with cocaine use-four states, March 2008-November 2009 (Reprinted from MMWR, vol 58, pg 1381-1385, 2009). JAMA - JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION 2010;303(6):504.

Bradley A, Millington A. Agricultural land-use trajectories in a cocaine source region: Chapare, Bolivia. LAND-CHANGE SCIENCE IN THE TROPICS: CHANGING AGRICULTURAL LANDSCAPES 2008;231-250.

Casale JF, Boudreau DK, Jones LM. Tropane ethyl esters in illicit cocaine: Isolation, detection, and determination of new manufacturing by-products from the clandestine purification of crude cocaine base with ethanol. JOURNAL OF FORENSIC SCIENCES 2008;53(3):661-667.

Casale JF, Corbeil EM, Hays PA. Identification of levamisole impurities found in illicit cocaine exhibits. MICROGRAM JOURNAL 2008;6(3-4):82.

Casale J, Lydon J. Apparent effects of glyphosate on alkaloid production in coca plants grown in Colombia. JOURNAL OF FORENSIC SCIENCES 2007;52(3):573-578.

Casale JF, Nguyen MC. N-Acetylbenzocaine: Formation via transacetylation of benzocaine and acetylsalicylic acid in a cocaine exhibit. MICROGRAM JOURNAL 2010;7(1):7-11.

Casale JF, Orlando PM, Colley VL, Hays PA. Identification of diltiazem impurities / artifacts during the analyses of illicit cocaine exhibits containing diltiazem. MICROGRAM JOURNAL 2008;6(3-4):90.

Casale JF, Hays PA, Toske SG, Berrier AL. Four new illicit cocaine impurities from the oxidation of crude cocaine base: Formation and characterization of the diastereomeric 2,3-dihydroxy-3-phenylpropionylecgonine methyl esters from cis- and trans-cinnamoyl-cocaine. JOURNAL OF FORENSIC SCIENCES 2007;52(4):860-866.

Cecinato A, Balducci C, Nervegna G. Occurrence of cocaine in the air of the world's cities: An emerging problem? A new tool to investigate the social incidence of drugs? SCIENCE OF THE TOTAL ENVIRONMENT 2009;407(5):1683-1690.

Corbeil EM, Casale JF. Determination of cocaine in various South American commercial coca products. MICROGRAM JOURNAL 2008;6(3-4):109.

Czuchlewski DR, Brackney M, Ewers C, Manna J, Fekrazad MH, Martinez A, Nolte KB, Hjelle B, Rabinowitz I, Curtis BR, McFarland JG, Baumbach J, Foucar K. Clinico-pathologic features of agranulocytosis in the setting of levamisole-tainted cocaine. AMERICAN JOURNAL OF CLINICAL PATHOLOGY 2010;133(3):466-472.

Da Silva MJ, dos Anjos EV, Honorator RS, Pimentel MF, Paim AP. Spectrophotometric cocaine determination in a biphasic medium employing flow-batch sequential injection analysis. ANALYTICA CHIMICA ACTA 2008;629(1-2):98-103.

Davalos LM, Bejarano AC, Correa HL. Disabusing cocaine: Pervasive myths and enduring realities of a globalised commodity. INTERNATIONAL JOURNAL OF DRUG POLICY 2009;20(5):381-386.

Eliasson C, Macleod NA, Matousek P. Non-invasive detection of cocaine dissolved in beverages using displaced Raman spectroscopy. ANALYTICA CHIMICA ACTA 2008;607(1):50-53.

Gheorghe A, van Nuijs A, Pecceu B, Bervoets L, Jorens PG, Blust R, Neels H, Covaci A. Analysis of cocaine and its principal metabolites in waste and surface water using solid phase extraction and liquid chromatography-ion trap tandem mass spectrometry. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2008;391(4):1309-19.

Gostic T, Klemenc S, Stefane B. A study of the thermal decomposition of adulterated cocaine samples under optimized aerobic pyrolytic conditions. FORENSIC SCIENCE INTERNATIONAL 2009;187(1-3):19-28.

Gostic T, Klemenc S. Evidence on unusual way of cocaine smuggling: Cocaine-poly-methyl methacrylate (PMMA) solid solution - Study of clandestine laboratory samples. FORENSIC SCIENCE INTERNATIONAL 2007;169(2-3):210-219.

He JL, Wu ZS, Zhou H, Wang HQ, Jiang JH, Shen GL, Yu RQ. Fluorescence aptameric sensor for strand displacement amplification detection of cocaine. ANALYTICAL CHEMISTRY 2010;82(4):1358-1364.

Hewitt AJ, Solomon KR, Marshall EJP. Spray droplet size, drift potential, and risks to nontarget organisms from aerially applied glyphosate for coca control in Colombia. JOURNAL OF TOXICOLOGY AND ENVIRONMENTAL HEALTH-PART A-CURRENT ISSUES 2009;72(15-16):921-929.

Janowska E. Peruvian foodstuffs with cocaine. Z ZAGADNIEN NAUK SADOWYCH 2008;75:276-281.

Jones LM, Boudreau DK, Casale JF. "Crack" cocaine: A study of stability over time and temperature. MICROGRAM JOURNAL 2008;6(3-4):114.

Kinzie E. Levamisole found in patients using cocaine. ANNALS OF EMERGENCY MEDICINE 2009;53(4):546-547.

Knowles L, Buxton JA, Skuridina N, Achebe I, LeGatt D, Fan SH, Zhu NY, Talbot J. Levamisole tainted cocaine causing severe neutropenia in Alberta and British Columbia. HARM REDUCTION JOURNAL 2009;6.

Kolomiets YN, Pervukhin VV. Effect of UV irradiation on detection of cocaine hydrochloride and crack vapors by IMIS and API-MS methods. TALANTA 2009;78(2):542-547.

Mari F, Politi L, Biggeri A, Accetta G, Trignano C, Di Padua M, Bertol E. Cocaine and heroin in waste water plants: A 1-year study in the city of Florence, Italy. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):88-92.

Marshall EJP, Solomon KR, Carrasquilla G. Coca (Erythroxylum coca) control is affected by glyphosate formulations and adjuvants. JOURNAL OF TOXICOLOGY AND ENVIRONMENTAL HEALTH-PART A-CURRENT ISSUES 2009;72(15-16):930-936.

Matthews AR, Oladapo O, Morgan BW. A cocaine death with concomitant adulterant-induced toxicity. CLINICAL TOXICOLOGY 2009;47(7):290.

McGill JW, Dixon CA, Ritter D, Sides JD. Discovery of an interesting temperature effect on the sensitivity of cobalt thiocyanate test for cocaine. MICROGRAM JOURNAL 2008;6(1-2):26.

Moore JM, Casale JF. The discoloration of illicit drug samples. MICROGRAM JOURNAL 2008;6(3-4):128.

Oiye EN, de Figueiredo NB, de Andrade JF, Tristao HM, de Oliveira MF. Voltammetric determination of cocaine in confiscated samples using a cobalt hexacyanoferrate film-modified electrode. FORENSIC SCIENCE INTERNATIONAL 2009;192(1-3):94-97.

Pedersoli S, Lombardi L, Hoehr NF, Rittner R. Assignments of H-1 and C-13 NMR spectral data for benzoylecgonine, a cocaine metabolite. SPECTROSCOPY LETTERS 2008;41(3):101-103.

Pesaresi M. Textural analysis of coca plantations using remotely sensed data with resolution of 1 metre. INTERNATIONAL JOURNAL OF REMOTE SENSING 2008;29(23):6985-7002.

Pistos C, Karampela S, Papoutsis I, Athanaselis S, Spiliopoulou Ch, Maravelias C. Investigation of the identification point system adaptation in cocaine, benzoylecgonine and ecgonine methyl ester using a single quadrupole mass spectrometer. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(23):3772-3780.

Qaseem A, Shekelle P, Owens DK. Agranulocytosis after consumption of cocaine adulterated with levamisole. ANNALS OF INTERNAL MEDICINE 2009;150(4):287-289.

Raymon LP, Isenschmid DS. The possible role of levamisole in illicit cocaine preparations. JOURNAL OF ANALYTICAL TOXICOLOGY 2009;33(9):620-622.

Rincon DA, Cordeiro M, Mosquera RA, Borges F. Theoretical study of cocaine and ecgonine methyl ester in gas phase and in aqueous solution. CHEMICAL PHYSICS LETTERS 2009;467(4-6):249-254.

Ropero-Miller JD, Stout PR, Bynum ND, Casale JF. Comparison of the novel direct analysis in real time time-of-flight mass spectrometry (AccuTOF-DART) and signature analysis for the identification of constituents of refined illicit cocaine. MICROGRAM JOURNAL 2007;5(1-4):34-40.

Shiyahovsky B, Di L, Weizmann Y, Nowarski R, Kotler M, Willner I. Spotlighting of cocaine by an autonomous aptamer-based machine. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2007;129(13):3814.

Smith RM, Casale JF. The mass spectrum of cocaine: Deuterium labeling and MS/MS studies. MICROGRAM JOURNAL 2010;7(1):16-41.

Storti CC, De Grauwe P. The cocaine and heroin markets in the era of globalisation and drug reduction policies. INTERNATIONAL JOURNAL OF DRUG POLICY 2009;20(6):488-496.

Tadmor T, Vadasz Z, Polliack A, Attias D. Two cases of agranulocytosis associated with cocaine use: Is this phenomenon becoming more prevalent? EUROPEAN JOURNAL OF HAEMATOLOGY 2010;84(5):458-459.

Wiens MO, Son WK, Ross C, Hayden M, Carleton B. Cocaine adulterant linked to neutropenia. CANADIAN MEDICAL ASSOCIATION JOURNAL 2009;182(1):57-59.

Zhang CY, Johnson LW. Single quantum-dot-based aptameric nanosensor for cocaine. ANALYTICAL CHEMISTRY 2009;81(8):3051-3055.

Emerging Substances (including MDPV and "FLY" compounds):

Andreasen MF, Telving R, Birkler RI, Schumacher B, Johannsen M. A fatal poisoning involving Bromo-Dragonfly. FORENSIC SCIENCE INTERNATIONAL 2009;183(1-3):91-96.

Bozenko JS, Yohannan JC. The characterization of 3,4-methylenedioxypyrovalerone (MDPV). MICROGRAM JOURNAL 2010;7(1):12-15.

Funada M. Uncontrolled newly-abused drugs (law-evading drugs). NIPPON YAKURIGAKU ZASSHI 2007;130(5):433-435.

Kenney J. Not so legal, "Legal Highs". JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(4):12.

Kikura-Hanajiri R, Kawamura M, Uchiyama N, Ogata J, Kamakura H, Saisho K, Goda Y. Analytical data of designated substances (Shitei-Yakubutsu) controlled by the pharmaceutical affairs law in Japan, part I: GC-MS and LC-MS. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(12):1857-1857.

Kikura-Hanajiri R, Kawamura M, Uchiyama N, Ogata J, Kamakura H, Saisho K, Goda Y. Analytical data of designated substances (Shitei-Yakubutsu) controlled by the pharmaceutical affairs law in Japan, part I: GC-MS and LC-MS. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(6):971-979.

Kikura-Hanajiri R, Maruyama T, Miyashita A, Goda Y. Chemical and DNA analyses for the products of a psychoactive plant, Voacanga africana. YAKUGAKU ZASSHI -

JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2009;129(8):975-982.

Masahiko F. Uncontrolled newly-abused drugs (law-evading drugs). FOLIA PHARMACOLOGICA JAPONICA 2007;130(5):433-435.

Nagashima J, Seto T, Takahashi M, Suzuki J, Mori K, Ogino S. Analyses of uncontrolled drugs purchased from April 2007 to March 2008 and newly found compounds. TOKYO-TO KENKO ANZEN KENKYU SENTA KENKYU NENPO 2009;59:71-77.

Piggee C. Investigating a not-so-natural-high. ANALYTICAL CHEMISTRY 2009.

Reed EC, Kiddon GS. The characterization of three FLY compounds. MICROGRAM JOURNAL 2007;5(1-4):26-33.

Sauer C, Peters FT, Haas C, Meyer MR, Fritschi G, Maurer HH. New designer drug alpha-pyrrolidinovalerophenone (PVP): Studies on its metabolism and toxicological detection in rat urine using gas chromatographic/mass spectrometric techniques. JOURNAL OF MASS SPECTROMETRY 2009;44(6):952-964.

Thevis M, Thomas A, Kohler M, Beuck S, Schaenzer W. Emerging drugs: Mechanism of action, mass spectrometry and doping control analysis. JOURNAL OF MASS SPECTROMETRY 2009;44(4):442-460.

Uchiyama N, Kawamura M, Kamakura H, Kikura-Hanajiri R, Goda Y. Analytical data of designated substances (shitei-yakubutsu) controlled by the pharmaceutical affairs law in Japan, part II: Color test and TLC. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(6):981-987.

Westphal F, Junge T, Roesner P, Soennichsen F, Schuster F. Mass and NMR spectroscopic characterization of 3,4-methylenedioxypyrovalerone: A designer drug with alpha-pyrrolidinophenone structure. FORENSIC SCIENCE INTERNATIONAL 2009;190(1-3):1-8.

Wood DM, Button J, Lidder S, Ovaska H, Ramsey J, Holt DW, Dargan PI. Detection of the novel recreational drug diphenyl-2-pyrrolidinemethanol (D2PM) sold 'legally' in combination with glaucine. CLINICAL TOXICOLOGY 2008;46(5):193-.

Yohannan J. Driving under the influence, but under the influence of what? An

introduction to MDPV. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

Zaitsu K, Katagi M, Kamata H, Nakanishi K, Shima N, Kamata T, Nishioka H, Miki A, Tatsuno M, Tsuchihashi H. Simultaneous analysis of six novel hallucinogenic (tetrahydrobenzodifuranyl)aminoalkanes (FLYs) and (benzodifuranyl)aminoalkanes (DragonFLYs) by GC-MS, LC-MS, and LC-MS-MS. FORENSIC TOXICOLOGY 2010;28(1):9-18.

Zhang ZY, An LY, Hu WX, Xiang YH. 3D-QSAR study of hallucinogenic phenylalkylamines by using CoMFA approach. JOURNAL OF COMPUTER-AIDED MOLECULAR DESIGN 2007;21(4):145.

Ergot Alkaloids (see also LSD):

Crews C, Anderson WAC, Rees G, Krska R. Ergot alkaloids in some rye-based UK cereal products. FOOD ADDITIVES & CONTAMINANTS PART B-SURVEILLANCE 2009;2(1):79-85.

Krska R, Berthiller F, Schuhmacher R, Nielsen KF, Crews C. Determination of ergot alkaloids: Purity and stability assessment of standards and optimization of extraction conditions for cereal samples. JOURNAL OF AOAC INTERNATIONAL 2008;91(6):1363-1371.

Krska R, Crews C. Significance, chemistry and determination of ergot alkaloids: A review. FOOD ADDITIVES & CONTAMINANTS 2008;25(6):722-731.

Krska R, Stubbings G, Macarthur R, Crews C. Simultaneous determination of six major ergot alkaloids and their epimers in cereals and foodstuffs by LC-MS-MS. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2008;391(2):563-576.

Muller C, Kemmlein S, Klaffke H, Krauthause W, Preiss-Weigert A, Wittkowski R. A basic tool for risk assessment: A new method for the analysis of ergot alkaloids in rye and selected rye products. MOLECULAR NUTRITION & FOOD RESEARCH 2009;53(4):500-507.

Fentanyl(s):

Cicero TJ, Inciardi JA, Surratt H. Trends in the use and abuse of branded and generic

extended release oxycodone and fentanyl products in the United States. DRUG AND ALCOHOL DEPENDENCE 2007;91:115-120.

Denton JS, Donoghue ER, McReynolds J, Kalelkar MB. An epidemic of illicit fentanyl deaths in Cook County, Illinois: September 2005 through April 2007. JOURNAL OF FORENSIC SCIENCES 2008;53(2):452-454.

Gupta PK, Manral L, Ganesan K, Dubey DK. Use of single-drop microextraction for determination of fentanyl in water samples. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2007;388(3):579-583.

Higashikawa Y, Suzuki S. Studies on 1-(2-phenethyl)-4-(N-propionylanilino)piperidine (fentanyl) and its related compounds: Novel metabolites in rat urine following injection of alpha-methylfentanyl, one of the most abused typical designer drugs. JOURNAL OF HEALTH SCIENCE 2008;54(6):629-637.

Higashikawa Y, Suzuki S. Studies on 1-(2-phenethyl)-4-(N-propionylanilino) piperidine (fentanyl) and it related compounds. VI. Structure-analgesic activity relationship for fentanyl, methyl-substituted fentanyls and other analogues. FORENSIC TOXICOLOGY 2008;26(1):1-5.

Lurie IS, Iio R. Use of multiple-reaction monitoring ratios for identifying incompletely resolved fentanyl homologs and analogs via ultra-high-pressure liquid chromatography - tandem mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2009;1216(9):1515-1519.

Ojanpera I, Gergov M, Liiv M, Riikoja A, Vuori E. An epidemic of fatal 3-methyl-fentanyl poisoning in Estonia. INTERNATIONAL JOURNAL OF LEGAL MEDICINE 2008;122(5):395-400.

VanNimmen NFJ, Veulemans HAF. Validated GC-MS analysis for the determination of residual fentanyl in applied Durogesic reservoir and Durogesic D-Trans Matrix trans-dermal fentanyl patches. JOURNAL OF CHROMATOGRAPHY B - ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2007;846(1-2):264.

Vuckovic S, Prostran M, Ivanovic M, Dosen-Micovic L, Todorovic Z, Nesic Z, Stojanovic R, Divac N, Mikovic Z. Fentanyl analogs: Structure-activity-relationship study. CURRENT MEDICINAL CHEMISTRY 2009;16(19):2468-2474.

Wang Y, Dai H, Wu X, Chen H, Xu L, Chen Y, Chen G. Electrochemiluminescence determination of fentanyl citrate with a novel glassy carbon paste electrode. LUMINESCENCE 2008;23(2):99-99.

Wong SC, Curtis JA, Wingert WE. Concurrent detection of heroin, fentanyl, and xylazine in seven drug-related deaths reported from the Philadelphia Medical Examiner's Office. JOURNAL OF FORENSIC SCIENCES 2008;53(2):495-498.

Yamamoto K, Kojima M, Iguchi H, Ohta T. Measurement of amount of fentanyl remaining in used patches: Investigation of clinical factors affecting the remaining amounts in 4 patients. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(6):959-964.

***Flos Daturae*:**

Li JG, Chun Y, Ju HX. Simultaneous electrochemiluminescence detection of anisodamine, atropine, and scopolamine in Flos daturae by capillary electrophoresis using beta-Cyclodextrin as additive. ELECTROANALYSIS 2007;19(15):1569-1574.

Fluoxetine (Prozac):

Patel RB, Patel MR, Shankar MB, Bhatt KK. Simultaneous determination of alprazolam and fluoxetine hydrochloride in tablet formulations by high-performance column liquid chromatography and high-performance thin-layer chromatography. JOURNAL OF AOAC INTERNATIONAL 2009;92(4):1082-1088.

Patel S, Patel NJ. Simultaneous RP-HPLC and HPTLC estimation of fluoxetine hydrochloride and olanzapine in tablet dosage forms. INDIAN JOURNAL OF PHARMACEUTICAL SCIENCES 2009;71(4):477-480.

Heroin:

Agg KM, Barnett NW, Lewis SW, Pearson JR. Preliminary investigations into tris(2,2'-bipyridyl) ruthenium (III) as a chemiluminescent reagent for the detection of 3,6-diacetylmorphine (heroin) on surfaces. JOURNAL OF FORENSIC SCIENCES 2007;52(5):1111-1114.

Agg KM, Craddock AF, Bos R, Francis PS, Lewis SW, Barnett NW. A rapid test for heroin (3,6-diacetylmorphine) based on two chemiluminescence reactions. JOURNAL

OF FORENSIC SCIENCES 2007;52(3):759-759.

Buryakov IA, Baldin MN. Comparison of negative and positive modes of ion-mobility increment spectrometry in the detection of heroin vapors. JOURNAL OF ANALYTICAL CHEMISTRY 2008;63(8):787-791.

Casale JF, Toske SG, Hays PA. Chlorinated opium alkaloid derivatives produced by the use of aqueous sodium hypochlorite during the clandestine manufacture of heroin. JOURNAL OF FORENSIC SCIENCES 2009;54(2):359-364.

Ciccarone D, Unick GJ, Kraus A. Impact of South American heroin on the US heroin market 1993-2004. INTERNATIONAL JOURNAL OF DRUG POLICY 2009;20(5):392-401.

Dussy FE, Berchtold C, Briellmann TA, Lang C, Steiger R, Bovens M. Validation of an ion mobility spectrometry (IMS) method for the detection of heroin and cocaine on incriminated material. FORENSIC SCIENCE INTERNATIONAL 2008;177(2-3):105-111.

Gheorghe M, Balalau D, Ilie M, Baconi DL, Ciobanu AM. Component analysis of illicit heroin samples by GC-MS method. FARMACIA 2008;56(5):577-582.

Hill LA, Lenehan CE, Francis PS, Adcock JL, Gange ME, Pfeffer FM, Barnett NW. A screening test for heroin based on sequential injection analysis with dual-reagent chemiluminescence detection. TALANTA 2008;76(3):674-679.

Jiggens J. Australian heroin seizures and the causes of the 2001 heroin shortage. INTERNATIONAL JOURNAL OF DRUG POLICY 2008;19(4):273-278.

Kerr SC, Casale JF. The use of dipropionylmorphine as a structurally-related internal standard for gas chromatographic quantitation of heroin. MICROGRAM JOURNAL 2008;6(1-2):3.

Kleinschmidt K, Feng S, Goto C, Sobotka A, Liebbe J. Difficulty in the forensic laboratory assessment of "Cheese" - A new form of heroin. CLINICAL TOXICOLOGY 2007;45:224.

Liu M, Song C, Qiao J, Wang Y. Component and purity of retail heroin and concentration ratio of morphine to codeine in urine of heroin abusers. ZHONGGUO

YAOWU YILAIXING ZAZHI 2007;16(5):386-9.

Moros J, Galipienso N, Vilches R, Garrigues S, de la Guardia M. Nondestructive direct determination of heroin in seized illicit street drugs by diffuse reflectance near-infrared spectroscopy. ANALYTICAL CHEMISTRY 2008;80(19):7257-7265.

Moros J, Kuligowski J, Quintas G, Garrigues S, de la Guardia M. New cut-off criterion for uninformative variable elimination in multivariate calibration of near-infrared spectra for the determination of heroin in illicit street drugs. ANALYTICA CHIMICA ACTA 2008;630(2):150-160.

Risser D, Uhl A, Oberndorfer F, Honigschnabl S, Stichenwirth M, Hirz R, Sebald D. Is there a relationship between street heroin purity and drug-related emergencies and/or drug-related deaths? An analysis from Vienna, Austria. JOURNAL OF FORENSIC SCIENCES 2007;52(5):1171-1176.

Rudakov TN, Hayes PA, Flexman JH. Optimized NQR pulse technique for the effective detection of heroin base. SOLID STATE NUCLEAR MAGNETIC RESONANCE 2008;33(3):31-35.

Subhan F, Khan N, Sewell RDE. Adulterant profile of illicit street heroin and reduction of its precipitated physical dependence withdrawal syndrome by extracts of St. John's Wort (Hypericum perforatum). PHYTOTHERAPY RESEARCH 2009;23(4):564-571.

Toprak S, Cetin I. Heroin overdose deaths and heroin purity between 1990 and 2000 in Istanbul, Turkey. JOURNAL OF FORENSIC SCIENCES 2009;54(5):1185-1188.

Wodak A. What caused the recent reduction in heroin supply in Australia? INTERNATIONAL JOURNAL OF DRUG POLICY 2008;19(4):279-286.

Wu G-P, Xiang B-R. A new method for fast and nondestructive analysis of heroin, 6-acetylmorphine, and codeine in drug by near infrared spectroscopy. FENXI HUAXUE 2007;35(4):552.

Yang S, Liu X, Qiao J. Analysis of diluents in retail heroin seized in Beijing in 2005. ZHONGGUO YAOWU YILAIXING ZAZHI 2007;16(4):276-80.

Zhang ZX, Yan B, Liu KL, Bo T, Liao YP, Liu HW. Fragmentation pathways of heroin-related alkaloids revealed by ion trap and quadrupole time-of-flight tandem mass

spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2008;22(18):2851-2862.

Zhang ZX, Yan B, Liu KL, Liao YP, Liu HW. CE-MS analysis of heroin and its basic impurities using a charged polymer-protected gold nanoparticle-coated capillary. ELECTROPHORESIS 2009;30(2):379-387.

gamma-Hydroxybutyric Acid (GHB), gamma-Butyrolactone (GBL) and 1,4-Butanediol (BD):

Bennett MJ. Detection of GHB in various drink matrices via AccuTOF-DART. 2008 American Academy of Forensic Sciences Annual Meeting.

Bennett MJ, Steiner RR. Detection of gamma-hydroxybutyric acid in various drink matrices via AccuTOF-DART. JOURNAL OF FORENSIC SCIENCES 2009;54(2):370-375.

Brewster VL, Edwards HGM, Hargreaves MD, Munshi T. Identification of the date-rape drug GHB and its precursor GBL by Raman spectroscopy. DRUG TESTING AND ANALYSIS 2009;1(1-2):25-31.

Carter LP, Pardi D, Gorsline J, Griffiths RR. Illicit gamma-hydroxybutyrate (GHB) and pharmaceutical sodium oxybate [Xyrem (R)]: Differences in characteristics and misuse. DRUG AND ALCOHOL DEPENDENCE 2009;104(1-2):1-10.

Dempsey DA, Wiegand TJ, Havel C, Benowitz NL, Haller C. Butanediol (BD) conversion to gamma-hydroxybutyrate, (GHB), is markedly reduced by fomepizole (4-MP), an alcohol dehydrogenase blocker. CLINICAL TOXICOLOGY 2009;47(7):113.

Elie MP, Baron MG, Birkett JW. Enhancement of microcrystalline identification of gamma-hydroxybutyrate. JOURNAL OF FORENSIC SCIENCES 2008;53(1):147-150.

Henck C, Nally L. GC-MS analysis gamma-hydroxybutyric acid analogs: A forensic chemistry experiment. JOURNAL OF CHEMICAL EDUCATION 2007;84:1813-1815.

Majid MA. Identification of gamma-hydroxybutyrate (GHB), gamma-butyrolactone (GBL) and 1,4-butanediol using trimethyl derivatization. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

Marinetti L. History and pharmacology of γ-hydroxybutyric acid. CHROMATOGRAPHIC METHODS IN CLINICAL CHEMISTRY AND TOXICOLOGY 2007:197.

Meng PJ. Analysis of gamma-hydroxybutyric acid using gas chromatography/mass spectrometry after pentafluorobenzyl derivatization. FENXI HUAXUE 2008;36(1):61-65.

Mercer JW, Oldfield LS, Hoffman KN, Shakleya DM, Bell SC. Comparative analysis of gamma-hydroxybutyrate and gamma-hydroxyvalerate using GC/MS and HPLC. JOURNAL OF FORENSIC SCIENCES 2007;52(2):383-388.

Michalik KA, Brettell TA. The detection of gamma-hydroxybutyric acid through the use of a rapid colorimetric test. 2008 American Academy of Forensic Sciences Annual Meeting.

Saudan C, Augsburger M, Mangin P, Saugy M. Carbon isotopic ratio analysis by gas chromatography/combustion/isotope ratio mass spectrometry for the detection of gamma-hydroxybutyric acid (GHB) administration to humans. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2007;21(24):3956-3962.

Human Growth Hormone (HGH):

Hancock WS, Jiang H, Karger BL,Wu SL. Mass spectrometric analysis of innovator, counterfeit, and follow-on recombinant human growth hormone. BIOTECHNOLOGY PROGRESS 2009;25(1):207-218.

Ketamine:

Pieri M, Castiglia L, Miraglia N, Guadagni R, Malorni L, Sannolo N, Acampora A, Della Casa E. Study of the fragmentation pattern of ketamine-heptafluorobutyramide by gas chromatography/electron ionization mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2010;24(1):49-56.

Wang G, Shen J, Jia Y. Vibrational spectra of ketamine hydrochloride and 3,4-methylenedioxymethamphetamine in terahertz range. JOURNAL OF APPLIED PHYSICS 2007;102(1):013106/1.

Khat:

Balint EE, Falkay G, Balint GA. Khat - a controversial plant. WIENER KLINISCHE WOCHENSCHRIFT 2009;121(19-20):604-614.

Chappell JS, Lee MM. Cathinone preservation in khat evidence via drying. FORENSIC SCIENCE INTERNATIONAL 2010;195(1-3):108-120.

Krizevski R, Dudai N, Bar E, Dessow I, Ravid U, Lewinsohn E. Quantitative stereo-isomeric determination of phenylpropylamino alkaloids in khat (Catha edulis Forsk.) using chiral GC-MS. ISRAEL JOURNAL OF PLANT SCIENCES 2008;56(3):207-213.

Krizevski R, Dudai N, Bar E, Lewinsohn E. Developmental patterns of phenylpropyl-amino alkaloids accumulation in khat (Catha edulis Forsk.). JOURNAL OF ETHNOPHARMACOLOGY 2007;114(3):432-438.

Tefera TL. Supply response, local reality and livelihood sustainability: The policy dilemma of khat (Catha edulis) production in eastern Ethiopia. INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY 2009;7(3):176-188.

Kratom (and Mitragynine):

Assanangkornchai S, Muekthong A, Sam-Angsri N, Pattanasattayawong U. The use of Mitragynine speciosa ("Kratom"), an addictive plant, in Thailand. SUBSTANCE USE & MISUSE 2007;42(14):2145-2157.

Chittrakarn S, Keawpradub N, Sawangjaroen K, Kansenalak S, Janchawee B. Mitragynine and methanol extract of kratom leaf (Mitragyna speciosa Korth.) inhibited compound nerve action potential. DRUG METABOLISM REVIEWS 2009;41(205).

Kikura-Hanajiri R, Kawamura M, Maruyama T, Kitajima M, Takayama H, Goda Y. Simultaneous analysis of mitragynine, 7-hydroxymitragynine, and other alkaloids in the psychotropic plant "kratom" (Mitragyna speciosa) by LC-ESI-MS. FORENSIC TOXICOLOGY 2009;27(2):67-74.

Leon F, Habib E, Adkins JE, Furr EB, McCurdy CR, Cutler SJ. Phytochemical characterization of the leaves of mitragyna speciosa grown in USA. NATURAL PRODUCT COMMUNICATIONS 2009;4(7):907-910.

Liu HN, McCurdy CR, Doerksen RJ. Computational study on the conformations of mitragynine and mitragynaline. JOURNAL OF MOLECULAR STRUCTURE -

THEOCHEM 2010;945(1-3):57-63.

Maruyama T, Kawamura M, Kikura-Hanajiri R, Takayama H, Goda Y. The botanical origin of kratom (Mitragyna speciosa; Rubiaceae) available as abused drugs in the Japanese markets. JOURNAL OF NATURAL MEDICINES 2009;63(3):340-344.

Phongprueksapattana S, Putalun W, Keawpradub N, Wungsintaweekul J. Mitragyna speciosa: Hairy root culture for triterpenoid production and high yield of mitragynine by regenerated plants. ZEITSCHRIFT FUR NATURFORSCHUNG SECTION C - A JOURNAL OF BIOSCIENCES 2008;63(9-10):691-698.

Roche KM, Hart K, Sangalli B, Lefberg J, Bayer M. Kratom: A case of a legal high. CLINICAL TOXICOLOGY 2008;46(7):41-.

Sukrong S, Zhu S, Ruangrungsi N, Phadungcharoen T, Palanuvej C, Komatsu K. Molecular analysis of the genus Mitragyna existing in Thailand based on rDNA ITS sequences and its application to identify a narcotic species: Mitragyna speciosa. BIOLOGICAL & PHARMACEUTICAL BULLETIN 2007;30(7):1284-1288.

LSD:

Inoue T, Yokoshima S, Fukuyama T. Synthetic studies toward (+)-lysergic acid: Construction of the tetracyclic ergoline skeleton. HETEROCYCLES 2009;79:373-378.

Moldvai I, Gacs-Baitz E, Termesvari-Major E, Russo L, Papai I, Rissanen K, Szarics E, Kardos J, Szantay C. Dimerization of (+)-lysergic acid esters. HETEROCYCLES 2007;71(5):1075-1094.

Marijuana and Related Cannabinoids:

Aarons JN. Laboratory and field experiments used for the determination of odor signature chemicals in marijuana. 2008 American Academy of Forensic Sciences Annual Meeting.

Ahmed SA, Ross SA, Slade D, Radwan MM, Khan IA, Elsohly MA. Structure determination and absolute configuration of cannabichromanone derivatives from high potency Cannabis sativa. TETRAHEDRON LETTERS 2008;49(42):6050-6053.

Ahmed SA, Ross SA, Slade D, Radwan MM, Zulfiqar F, Matsumoto RR, Xu YT, Viard

E, Speth RC, Karamyan VT, ElSohly MA. Cannabinoid ester constituents from high-potency Cannabis sativa. JOURNAL OF NATURAL PRODUCTS 2008;71(6):1119-1119.

Ahmed SA, Ross SA, Slade D, Radwan MM, Zufiqar A, ElSohly MA. Isolation and characterization of new cannabis constituents from a high potency variety. PLANTA MEDICA 2008;74(3):P15.

Ahmed SA, Ross SA, Slade D, Radwan MM, Zulfiqar F, ElSohly MA. Cannabinoid ester constituents from high-potency Cannabis sativa. JOURNAL OF NATURAL PRODUCTS 2008;71(4):536-542.

Appendino G, Giana A, Gibbons S, Maffei M, Gnavi G, Grassi G, Sterner O. A polar cannabinoid from Cannabis sativa var. Carma. NATURAL PRODUCT COMMUNICATIONS 2008;3(12):1977-1980.

Appendino G, Gibbons S, Giana A, Pagani A, Grassi G, Stavri M, Smith E, Rahman M. Antibacterial cannabinoids from Cannabis sativa: A structure-activity study. JOURNAL OF NATURAL PRODUCTS 2008;71(8):1427-1430.

Balducci C, Nervegna G, Cecinato A. Evaluation of principal cannabinoids in airborne particulates. ANALYTICA CHIMICA ACTA 2009;641(1-2):89-94.

Boleda MR, Galceran MT, Ventura F. Trace determination of cannabinoids and opiates in wastewater and surface waters by ultra-performance liquid chromatography-tandem mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2007;1175(1):38.

Chou SL, Ling YC, Yang MH, Pai CY. Determination of delta(9)-tetrahydrocannabinol in indoor air as an indicator of marijuana cigarette smoking using adsorbent sampling and in-injector thermal desorption gas chromatography-mass spectrometry. ANALYTICA CHIMICA ACTA 2007;598(1):103-109.

De Backer B, Debrus B, Lebrun P, Theunis L Dubois N, Decock L Verstraete A, Hubert P, Charlier C. Innovative development and validation of an HPLC/DAD method for the qualitative and quantitative determination of major cannabinoids in cannabis plant material. JOURNAL OF CHROMATOGRAPHY B - ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2009;877(32):4115-4124.

de Meijer EPM, Hammond KM, Micheler M. The inheritance of chemical phenotype in

Cannabis sativa L. (III): Variation in cannabichromene proportion. EUPHYTICA 2009;165(2):293-311.

de Meijer EPM, Hammond KM, Sutton A. The inheritance of chemical phenotype in Cannabis sativa L. (IV): Cannabinoid-free plants. EUPHYTICA 2009;168(1):95-112.

de Oliveira GL, Voloch MH, Sztulman GB, Neto ON, Yonamine M. Cannabinoid contents in cannabis products seized in Sao Paulo, Brazil, 2006-2007. FORENSIC TOXICOLOGY 2008;26(1):31-35.

Fischedick JT, Glas R, Hazekamp A, Verpoorte R. A qualitative and quantitative HPTLC densitometry method for the analysis of cannabinoids in Cannabis sativa L. PHYTOCHEMICAL ANALYSIS 2009;20(5):421-426.

Flemming T, Muntendam R, Steup C, Kayser O. Chemistry and biological activity of tetrahydrocannabinol and its derivatives. TOPICS IN HETEROCYCLIC CHEMISTRY 2007;10(Bioactive Heterocycles IV):1-42.

Florian NM, Parada F, Garzon WF. Study of cannabinoids content in marihuana samples (Cannabis sativa L.) cultivated in several regions of Colombia. VITAE-REVISTA DE LA FACULTAD DE QUIMICA FARMACEUTICA 2009;16(2):237-244.

Fucci N. Analysis of fatty acids in marijuana (Cannabis sativa leaf). MICROGRAM JOURNAL 2007;5(1-4):20-6.

Garcia A, Borchardt D, Chang CA, Marsella MJ. Thermal isomerization of cannabinoid analogues. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2009;131(46):16640-16641.

Hakki EE, Kayis SA, Pinarkara E, Sag A. Inter simple sequence repeats separate efficiently hemp from marijuana (Cannabis sativa L.) ELECTRONIC JOURNAL OF BIOTECHNOLOGY 2007;10(4):None.

Holler JM, Bosy TZ, Dunkley CS, Levine B, Past MR, Jacobs A. Tetrahydrocannabinol content of commercially available hemp products. JOURNAL OF ANALYTICAL TOXICOLOGY 2008;32(6):428-432.

Holler JM, Smith ML, Paul SN, Past MR, Paul BD. Isomerization of delta-9-THC to delta-8-THC when tested as trifluoroacetyl-, pentafluoropropionyl-, or heptafluoro-

butyryl-derivatives. JOURNAL OF MASS SPECTROMETRY 2008;43(5):674-679.

Howard C, Gilmore S, Robertson J, Peakall R. A cannabis STR genotype database for Australian seizures: Forensic applications and limitations. JOURNAL OF FORENSIC SCIENCES 2009;54(3):556-563.

Howard C, Gilmore S, Robertson J, Peakall R. Developmental validation of a cannabis sativa STIR multiplex system for forensic analysis. JOURNAL OF FORENSIC SCIENCES 2008;53(5):1061-1067.

Knight G, Hansen S. An experimental indoor hydroponic cannabis growing set-up, using the screen of green (ScrOG) method. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(1):12.

Lee JS, Park YH, Rhee JS, Jeong JI, Lim MA, Chung HS. Planting conditions of Korean cannabis derived from stable isotope ratio and tetrahydrocannabinol contents. YAKHAK HOECHI 2008;52(3):172-175.

McLaren J, Swift W, Dillon P, Allsop S. Cannabis potency and contamination: A review of the literature. ADDICTION 2008;103(7):1100-1109.

Mehmedic Z, Slade D, Denham H, Chandra S, Stanford D, Khan IA, ElSohly MA. Indoor and outdoor cultivation of cannabis: Is there an effect on the chemical composition of the volatile oil? PLANTA MEDICA 2008;74(3):P17.

Mendoza MA, Mills DK, Lata H, Chandra S, ElSohly MA, Almirall JR. Genetic individualization of Cannabis sativa by a short tandem repeat multiplex system. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;393(2):719-726.

Ogata J, Kikura-Hanajiri R, Yoshimatsu K, Kiuchi F, Goda Y. Detection method for the ability of hemp (Cannabis sativa L.) seed germination by the use of 2,3,5-triphenyl-2H-tetrazolium chloride (TTC). YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(11):1707-1711.

Pacifico D, Miselli F, Carboni A, Moschella A, Mandolino G. Time course of cannabinoid accumulation and chemotype development during the growth of Cannabis sativa L. EUPHYTICA 2008;160(2):231-240.

Peltzer K, Ramlagan S. Cannabis use trends in South Africa. SOUTH AFRICAN

JOURNAL OF PSYCHIATRY 2007;13(4):126-131.

Pinarkara E, Kayis SA, Hakki EE, Sag A. RAPD analysis of seized marijuana (Cannabis sativa L.) in Turkey. ELECTRONIC JOURNAL OF BIOTECHNOLOGY 2009;12(1).

Potter DJ, Clark P, Brown MB. Potency of delta(9)-THC and other cannabinoids in cannabis in England in 2005: Implications for psychoactivity and pharmacology. JOURNAL OF FORENSIC SCIENCES 2008;53(1):90-94.

Radwan MM, ElSohly MA, Slade D, Ahmed SA, Khan IA, Ross SA. Biologically active cannabinoids from high-potency Cannabis sativa. JOURNAL OF NATURAL PRODUCTS 2009;72(5):906-911.

Radwan MM, ElSohly MA, Slade D, Ahmed SA, Wilson L, Al-Alfy AT, Ross SA. Non-cannabinoid constituents from a high potency Cannabis sativa variety. PLANTA MEDICA 2008;74(9):1069-1069.

Radwan MM, ElSohly MA, Slade D, Ahmed SA, Wilson L, El-Alfy AT, Khan IA, Ross SA. Non-cannabinoid constituents from a high potency Cannabis sativa variety. PHYTOCHEMISTRY 2008;69(14):2627-2633.

Radwan MM, Ross SA, Slade D, Ahmed SA, Zulfiqar F, ElSohly MA. Isolation and characterization of new cannabis constituents from high potency variety. PLANTA MEDICA 2008;74(3):267-272.

Ricordel I, Wenzek M. Cannabis and safety of work. Evolution of its detection within the controls of narcotics since 2004 to the SNCF. ANNALS PHARMACEUTIQUES FRANCAISES 2008;66(4):255-260.

Stanaszek R, Zuba D. A comparison of developed and validated chromatographic methods (HPLC, GC-MS) for determination of delta-9-tetrahydrocannabinol and delta-9-tetrahydrocannabinolic acid in hemp. Z ZAGADNIEN NAUK SADOWYCH 2007;71:313-322.

Van der Kooy F, Pomahacova B, Verpoorte R. Cannabis smoke condensate II: Influence of tobacco on tetrahydrocannabinol levels. INHALATION TOXICOLOGY 2009;21(2):87-90.

Ware MA, St Arnaud-Trempe E. The abuse potential of the synthetic cannabinoid

nabilone. ADDICTION 2010;105(3):494-503.

Yoshimatsu K, Kitazawa T, Kawano N, Iida O, Kawahara N. Characteristics of Cannabis sativa L.: Seed morphology, germination and growth characteristics, and distinction from Hibiscus cannabinus L. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2010;130(2):237-246.

Mescaline/Peyote:

Carstairs SD, Cantrell FL. Crazy for cacti: A retrospective review of peyote exposures. CLINICAL TOXICOLOGY 2009;47(7):57.

Casado R, Uriarte I, Cavero RY, Calvo MI. LC-PAD determination of mescaline in cactus "Peyote" (Lophophora williamsii). CHROMATOGRAPHIA 2008;67(7-8):665-667.

MacLean H. Rock crystals and peyote dreams: Explorations in the Huichol universe. JOURNAL OF ANTHROPOLOGICAL RESEARCH 2008;64(3):448-449.

Mann J, Mann J. Peyote and amphetamines. TURN ON AND TUNE IN: PSYCHEDELICS, NARCOTICS AND EUPHORIANTS 2009;108-118,138-139.

Nakajima J, Aragane M, Hamano T, Shioda H, Yoshizawa M, Suzuki Y, Kitagawa S, Yasuda I Mori K, Ogino S. Analysis of mescaline in botanical uncontrolled drugs prepared from cactus. TOKYO-TO KENKO ANZEN KENYU SENTA KENKYU NENPO 2009;59:91-95.

Methadone:

Snozek CLH, Bjergum MW, Langman LJ. Gas chromatography-mass spectrometry method for the determination of methadone and 2-ethylidene-1,5-dimethyl-3,3-diphenyl-pyrrolidine (EDDP). CLINICAL APPLICATIONS OF MASS SPECTROMETRY: METHODS AND PROTOCOLS 2010;351-358.

Methcathinone (Also methcathinone-related compounds):

Archer RP. Fluoromethcathinone, a new substance of abuse. FORENSIC SCIENCE INTERNATIONAL 2009;185(1-3):10-20.

Belal T, Awad T, DeRuiter J, Clark CR. GC-IRD methods for the identification of isomeric ethoxyphenethylamines and methoxymethcathinones. FORENSIC SCIENCE INTERNATIONAL 2009;184(1-3):54-63.

Camilleri A, Johnston MR, Brennan M, Davis S, Caldicott DGE. Chemical analysis of four capsules containing the controlled substance analogues 4-methylmethcathinone, 2-fluoromethamphetamine, alpha-phthalimidopropiophenone and N-ethylcathinone. FORENSIC SCIENCE INTERNATIONAL 2010;197(1-3):59-66.

Combs MR. Analytical profile of 4-methylmethcathinone. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(1):2.

Dickson AJ, Vorce SP, Levine B, Past MR. Multiple-drug toxicity caused by the coadministration of 4-methylmethcathinone (Mephedrone) and heroin. JOURNAL OF ANALYTICAL TOXICOLOGY 2010;34(3):162-168.

Dyer C. Mephedrone is an amphetamine "by another name," drug adviser tells MPs. BRITISH MEDICAL JOURNAL 2010;340.

Fleming N. The truth about mephedrone. NEW SCIENTIST 2010;206(2757):42-45.

Kmietowicz Z. Home secretary bans mephedrone after taking advice from depleted council. BRITISH MEDICAL JOURNAL 2010;340.

Meyer MR, Wilhelm J, Peters FT, Maurer HH. beta-Keto amphetamines: Studies on the metabolism of the designer drug mephedrone and toxicological detection of mephedrone, butylone, and methylone in urine using gas chromatography-mass spectrometry. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2010;397(3):1225-1233.

Morris K. UK places generic ban on mephedrone drug family. LANCET 2010;375(9723):1333-1334.

Winstock AR, Marsden J, Mitcheson L. What should be done about mephedrone? BRITISH MEDICAL JOURNAL 2010;340.

Zuba D. Medicines containing ephedrine and pseudoephedrine as a source of methcathinone. Z ZAGADNIEN NAUK SADOWYCH 2007;71:323-333.

Methylenedioxyamphetamines and Related Compounds:

Awad T, Belal T, DeRuiter J, Clark CR. GC-IRD studies on regioisomeric ring substituted methoxy methyl phenylacetones related to 3,4-methylenedioxyphenylacetone. FORENSIC SCIENCE INTERNATIONAL 2010;194(1-3):39-48.

Belal T, Awad T, DeRuiter J, Clark CR. GC-MS studies on acylated derivatives of 3-methoxy-4-methyl- and 4-methoxy-3-methyl-phenethylamines: Regioisomers related to 3,4-MDMA. FORENSIC SCIENCE INTERNATIONAL 2008;178(1):61-82.

Boushehri SVS, Tamimi M, Kebriaeezadeh A. Quantitative determination of 3,4-methylenedioxymethamphetamine by thin-layer chromatography in ecstasy illicit pills in Teheran. TOXICOLOGY MECHANISMS AND METHODS 2009;19(9):565-569.

Bruhn JG, El-Seedi HR, Stephanson N, Beck O, Shulgin AT. Ecstasy analogues found in cacti. JOURNAL OF PSYCHOACTIVE DRUGS 2008;40(2):219-222.

Choodum A, Thavarungkul P, Kanatharana P, Smith NW. Ecstasy analysis by monolithic materials-capillary electrochromatography. ANALYTICAL SCIENCES 2009;25(4):517-522.

Collins M, Heagney A, Cordaro F, Odgers D, Tarrant G, Stewart S. Methyl 3-[3',4'-(methylenedioxy)phenyl]-2-methyl glycidate: An ecstasy precursor seized in Sydney, Australia. JOURNAL OF FORENSIC SCIENCES 2007;52(4):898-903.

da Costa JL, Pintao ER, Corrigliano CMC, Neto ON. Determination of 3,4-methylenedioxymethamphetamine (MDMA) In ecstasy tablets by high performance liquid chromatography with fluorescence detection (HPLC-FD). QUIMICA NOVA 2009;32(4):965-969.

de Korompay A, Hill JC, Carter JF, NicDaeid N, Sleeman R. Supported liquid-liquid extraction of the active ingredient (3,4-methylenedioxymethylamphetamine) from ecstasy tablets for isotopic analysis. JOURNAL OF CHROMATOGRAPHY A 2008;1178(1-2):1-8.

Deluca P, Schifano F, Psychonaut 2002 Research Group. Searching the internet for drug-related web sites: Analysis of online available information on ecstasy (MDMA). AMERICAN JOURNAL ON ADDICTIONS 2007;16(6):479-483.

Giraudon I, Bello PY. Monitoring ecstasy content in France: Results from the national surveillance system 1999-2004. SUBSTANCE USE & MISUSE 2007;42(10):1567-78.

Gura S, Guerra-Diaz P, Lai H, Almirall JR. Enhancement in sample collection for the detection of MDMA using a novel planar SPME (PSPME) device coupled to ion mobility spectrometry (IMS). DRUG TESTING AND ANALYSIS 2009;1(7-8):355-362.

Hakey PM, Allis DG, Hudson MR, Korter TM. Density functional dependence in the theoretical analysis of the terahertz spectrum of the illicit drug MDMA (Ecstasy). IEEE SENSORS JOURNAL 2010;10(3):478-484.

Inoue H, Hashimoto H, Watanabe S, Iwata YT, Kanamori T, Miyaguchi H, Tsujikawa K, Kuwayama K, Tachi N, Uetake N. Thermal desorption counter-flow introduction atmospheric pressure chemical ionization for direct mass spectrometry of ecstasy tablets. JOURNAL OF MASS SPECTROMETRY 2009;44(9):1300-1307.

Kato N, Fujita S, Ohta H, Fukuba M, Toriba A, Hayakawa K. Thin layer chromatography / fluorescence detection of 3,4-methylenedioxymethamphetamine and related compounds. JOURNAL OF FORENSIC SCIENCES 2008;53(6):1367-1371.

Kikura-Hanajiri R, Kawamura M, Miyajima A, Sunouchi M, Goda Y. Determination of a new designer drug, N-hydroxy-3,4-methylenedioxymethamphetamine and its metabolites in rats using ultra-performance liquid chromatography-tandem mass spectrometry. FORENSIC SCIENCE INTERNATIONAL 2010;198(1-3):62-69.

Lasmar MC, Leite EMA. Development and validation of a gas chromatography method for the determination of ecstasy and amphetamine derivatives in tablets. REVISTA BRASILEIRA DE CIENCIAS FARMACEUTICAS 2007;43(2):223.

Liu J, Decatur J, Proni G, Champeil E. Identification and quantitation of 3,4-methylene-dioxy-N-methylamphetamine (MDMA, ecstasy) in human urine by H-1 NMR spectroscopy. Application to five cases of intoxication. FORENSIC SCIENCE INTERNATIONAL 2010;194(1-3):103-107.

Luiz da Costa J, Pintao ER, Corrigliano CM, Negrini Neto O. Determination of 3,4-methylenedioxymethamphetamine (MDMA) in Ectasy tablets by high performance liquid chromatography with fluorescence detection (HPLC-FD). QUIMICA NOVA 2009;32(4):965-969.

Matsuda K, Fukuzawa T, Ishii Y, Yamada H. Color reaction of 3,4-methylenedioxy-amphetamines with chromotropic acid: Its improvement and application to the screening of seized tablets. FORENSIC TOXICOLOGY 2007;25(1):37.

Milhazes N, Martins P, Uriarte E, Garrido J, Calheiros R, Marques MPM, Borges F. Electrochemical and spectroscopic characterization of amphetamine-like drugs: Application to the screening of 3,4-methylenedioxymethamphetamine (MDMA) and its synthetic precursors. ANALYTICA CHIMICA ACTA 2007;596(2):231.

Salouros H, Collins M, Tarrant G, George AV. N-Cyanomethyl-N-methyl-1-(3',4'-methylenedioxyphenyl)-2-propylamine: An MDMA manufacturing by-product. JOURNAL OF FORENSIC SCIENCES 2008;53(5):1083-1091.

Thigpen AL, DeRuiter J, Clark CR. GC-MS studies on the regioisomeric 2,3-and 3,4-methylenedioxyphenethylamines related to MDEA, MDMMA, and MBDB. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2007;45(5):229-235.

Tsujikawa K, Kuwayama K, Miyaguchi H, Kanamori T, Iwata YT, Inoue H. Degradation of N-hydroxy-3,4-methylenedioxymethamphetamine in aqueous solution and its prevention. FORENSIC SCIENCE INTERNATIONAL 2009;193(1-3):106-111.

Tsujikawa K, Kuwayama K, Miyaguchi H, Kanamori T, Iwata YT, Inoue H. Increase in split ratio enables detection of underivatized N-hydroxy-3,4-methylenedioxymeth-amphetamine and N-hydroxy-3,4-methylenedioxyamphetamine by capillary GC-MS. FORENSIC TOXICOLOGY 2010;28(1):55-57.

Vogels N, Brunt TM, Rigter S, van Dijk P, Vervaeke H, Niesink RJM. Content of ecstasy in the Netherlands: 1993-2008. ADDICTION 2009;104(12):2057-2066.

Wang G, Shen J. Terahertz spectroscopic investigation of methylenedioxyamphetamine. PROCEEDINGS OF SPIE 2008;6840.

Wu G-p, Xiang B-r. Nondestructive determination of MDMA and MA in ecstasy by near infrared spectroscopy. FENXI CESHI XUEBAO 2007;26(5):698.

Yu XJ, Li GP. Determination of MDA and MDMA by TFA derivatization-GC/MS/MS. GUANGPU SHIYANSHI 2009;26(4):1051-1053.

Zaitsu K, Katagi M, Kamata HT, Miki A, Tsuchihashi H. Discrimination and identifica-

tion of regioisomeric beta-keto analogues of 3,4-methylenedioxyamphetamines by gas chromatography-mass spectrometry. FORENSIC TOXICOLOGY 2008;26(2):45-51.

Morphine, Codeine, and Related Opium Alkaloids:

Chaudhary V, Leisch H, Moudra A, Allen B, De Luca V, Cox DP, Hudlicky T. Biotransformations of morphine alkaloids by fungi: N-Demethylations, oxidations, and reductions. COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS 2009;74(7-8):1179-1193.

Feng SY, Chen WW, Huang W, Cheng M, Lin JQ, Li YZ, Chen R. Surface-enhanced Raman spectroscopy of morphine in silver colloid. CHINESE OPTICS LETTERS 2009;7(11):1055-1057.

Hansen SH. Sample preparation and separation techniques for bioanalysis of morphine and related substances. JOURNAL OF SEPARATION SCIENCE 2009;32(5-6):825-834.

Li F, Song J, Gao D, Zhang Q, Han D, Niu L. Simple and rapid voltammetric determination of morphine at electrochemically pretreated glassy carbon electrodes. TALANTA 2009;79(3):845-850.

Pejic N, Blagojevic S, Vukelic J, Kolar-Anic L, Anic S. Analyte pulse perturbation technique for the determination of O-6-acetylmorphine in seized street drug samples. BULLETIN OF THE CHEMICAL SOCIETY OF JAPAN 2007;80:1942-1948.

Rezaei B, Khayamian T, Mokhtari A. Simultaneous determination of codeine and noscapine by flow-injection chemiluminescence method using N-PLS regression. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;49(2):234-239.

Opiate Alkaloids (Also Opioids):

Berenyi S, Csutoras C, Sipos A. Recent developments in the chemistry of thebaine and its transformation products as pharmacological targets. CURRENT MEDICINAL CHEMISTRY 2009;16(25):3215-3242.

Bladek J, Polak P, Jarzyna E, Jakubowska I. Analysis of opiates and cannabinols by TLC. BIULETYN WOJSKOWEJ AKADEMII TECHNICZNEJ 2007;56(3):257-267.

Bogusz MJ. Opioids: Methods of forensic analysis. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:3-72.

Hamunen K, Paakkari P, Kalso E. Trends in opioid consumption in the Nordic countries 2002-2006. EUROPEAN JOURNAL OF PAIN 2009;13(9):954-962.

Hindson BJ, Francis PS, Purcell SD, Barnett NW. Determination of opiate alkaloids in process liquors using capillary electrophoresis. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2007;43(3):1164.

Jensen H, Kirby DA. Assessment of the smokeability of oxycodone HCl 80 mg controlled-release tablets. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(1):5.

Kumar MG, Lin Senshang. Hydromorphone: Analytical methodologies for its determination. CURRENT ANALYTICAL CHEMISTRY 2008;4(2):11-126.

Mann J, Mann J. Opiates from opium to heroin. TURN ON AND TUNE IN: PSYCHEDELICS, NARCOTICS AND EUPHORIANTS 2009;26-59,137.

Turner NW, Cauchi M, Piletska EV, Preston C, Piletsky SA. Rapid qualitative and quantitative analysis of opiates in extract of poppy head via FTIR and chemometrics: Towards in-field sensors. BIOSENSORS & BIOELECTRONICS 2009;24(11):3322-3328.

Opium (and Opium Poppies):

Apuya NR, Park JH, Zhang L, Ahyow M, Davidow P, Van Fleet J, Rarang JC, Hippley M, Johnson TW, Yoo HD, Trieu A, Krueger S, Wu CY, Lu YP, Flavell RB, Bobzin SC. Enhancement of alkaloid production in opium and California poppy by transactivation using heterologous regulatory factors. PLANT BIOTECHNOLOGY JOURNAL 2008;6(2):160-175.

Chakrabarti DK, Singh OP. Techniques to reproduce primary and secondary symptoms of downy mildew disease in opium poppy (Papaver somniferum L.). ADVANCES IN PLANT SCIENCES 2008;21(1):65-66.

Dittbrenner A, Mock HP, Borner A, Lohwasser U. Variability of alkaloid content in Papaver somniferum L. JOURNAL OF APPLIED BOTANY AND FOOD QUALITY -

ANGEWANDTE BOTANIK 2009;82(2):103-107.

Drea S, Hileman LC, De Martino G, Irish VF. Functional analyses of genetic pathways controlling petal specification in poppy. DEVELOPMENT 2007;134:4157-4166.

Dubey MK, Shasany AK, Dhawan OP, Shukla AK, Khanuja SPS. AFLP studies on downy-mildew-resistant and downy-mildew-susceptible genotypes of opium poppy. JOURNAL OF GENETICS 2010;89(1):9-19.

Dubey MK, Dhawan OP, Khanuja SPS. Downy mildew resistance in opium poppy: Resistance sources, inheritance pattern, genetic variability and strategies for crop improvement. EUPHYTICA 2009;165(1):177-188.

Dubey RB, Jain SK, Maloo SR. Combining ability and heterosis for latex yield, seed yield and other agronomic traits in opium poppy (Papaver somniferum L.). INDIAN JOURNAL OF GENETICS AND PLANT BREEDING 2007;67(4):392-395.

Facchini PJ, De Luca V. Opium poppy and Madagascar periwinkle: Model non-model systems to investigate alkaloid biosynthesis in plants. PLANT JOURNAL 2008;54(4):763-784.

Facchini PJ, Hagel JM, Liscombe DK, Loukanina N, MacLeod BP. Samanani N, Zulak KG. Opium poppy: Blueprint for an alkaloid factory. PHYTOCHEMISTRY REVIEWS 2007;6(1):97-124.

Finlay IG, Mancroft L, Field F. Opium production in Afghanistan - Let's re-examine buying the Afghan poppies that are left. BRITISH MEDICAL JOURNAL 2008;336(7657):1325-1325.

Foster RA, ONeill NR, Saunders JA. Potential biological control of opium poppy by fungal pathogens. PLANTA MEDICA 2008;74(3):P31.

Francis PS, Adcock JL, Costin JW, Purcell SD, Pfeffer FM, Barnett NW. Chemiluminescence detection of opium poppy (Papaver somniferum) alkaloids. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;48(3):508-518.

Gumuscu A, Arslan N, Sarihan EO. Evaluation of selected poppy (Papaver somniferum L.) lines by their morphine and other alkaloids contents. EUROPEAN FOOD RESEARCH AND TECHNOLOGY 2008;226(5):1213-1220.

Hagel JM, MacLeod BP, Facchini PJ. Opium poppy. BIOTECHNOLOGY IN AGRICULTURE AND FORESTRY 2007;169-187.

Hagel JM, Weljie AM, Vogel HJ, Facchini PJ. Quantitative H-1 nuclear magnetic resonance metabolite profiling as a functional genomics platform to investigate alkaloid biosynthesis in opium poppy. PLANT PHYSIOLOGY 2008;147(4):1805-1821.

Harvest T, Brown PH, Fist A, Gracie A, Gregory D, Koutoulis A. The latex capacity of opium poppy capsules is fixed early in capsule development and is not a major determinant in morphine yield. ANNALS OF APPLIED BIOLOGY 2009;154(2):251-258.

Higashi Y, Smith TJ, Jez JM, Kutchan TM. Crystallization and preliminary X-ray diffraction analysis of salutaridine reductase from the opium poppy Papaver somniferum. ACTA CRYSTALLOGRAPHICA SECTION F-STRUCTURAL BIOLOGY AND CRYSTALLIZATION COMMUNICATIONS 2010;66:163-166.

Khan R, Khan MMA, Singh M, Nasir S, Naeem M, Siddiqui MH, Mohammad F. Gibberellic acid and triacontanol can ameliorate the opium yield and morphine production in opium poppy (Papaver somniferum L.). ACTA AGRICULTURAE SCANDINAVICA SECTION B-SOIL AND PLANT SCIENCE 2007;57:307-312.

Kutchan TM, Ounaroon A, Haase S, Frick S. O-Methyltransferases of tetrahydrobenzylisoquinoline alkaloid biosynthesis in Papaver somniferum. PN US 07514251 Donald Danforth Plant Science Center. Official Gazette of the United States Patent and Trademark Office Patents 2009.

Lin X, Wang J, Li L, Wang X, Lu H, Xie Z. Separation and determination of five major opium alkaloids with mixed mode of hydrophilic/cation-exchange monolith by pressurized capillary electrochromatography. JOURNAL OF SEPARATION SCIENCE 2007;30(17):3011-3017.

Lisson SN. Temperature and photoperiod effects on the growth and development of opium poppy (Papaver somniferum). AUSTRALIAN JOURNAL OF EXPERIMENTAL AGRICULTURE 2007;47(6):742-748.

Montes-Borrego M, Ledesma FJM, Jimenez-Diaz RM, Landa BB. A nested-polymerase chain reaction protocol for detection and population biology studies of Peronospora arborescens, the downy mildew pathogen of opium poppy, using herbarium specimens and asymptomatic, fresh plant tissues. PHYTOPATHOLOGY 2009;99(1):73-81.

Panicker S, Wojno HL, Ziska LH. Quantitation of the major alkaloids in opium from Papaver setigerum DC. MICROGRAM JOURNAL 2007;5(1-4):13-9.

Pienkny S, Brandt W, Schmidt J, Jo RK, Ziegler J. Functional characterization of a novel benzylisoquinoline O-methyltransferase suggests its involvement in papaverine biosynthesis in opium poppy (Papaver somniferum L.). PLANT JOURNAL 2009;60(1):56-67.

Reid RG, Durham DG, Boyle SP, Low AS, Wangboonskul J. Differentiation of opium and poppy straw using capillary electrophoresis and pattern recognition techniques. ANALYTICA CHIMICA ACTA 2007;605(1):20-27.

Remberg B, Sterrantino AF, Artner R, Janitsch C, Krenn L. Science in drug control: The alkaloid content of Afghan opium. CHEMISTRY & BIODIVERSITY 2008;5(9):1770-1779.

Salehi P, Sonboli A, Zavareh AF, Sefidkon F, Dayeni M, Cheraghi B. Narcotic alkaloids of four Papaver species from Iran. ZEITSCHRIFT FÜR NATURFORSCHUNG C 2007;62(1-2):16.

Shukla S, Singh SP, Singh HB, Pushpangadan P. High yielding multiple disease resistant/tolerant stable variety 'Madakini' of opium poppy. PN US 07442854 AE Council of Scientific and Industrial Research. Official Gazette of the United States Patent and Trademark Office Patents 2008.

Steinberg M, Taylor M. Marginalizing a vulnerable cultural and environmental landscape - Opium poppy production in highland Guatemala. MOUNTAIN RESEARCH AND DEVELOPMENT 2007;27(4):318-321.

Werb D, Kerr T, Montaner J, Wood E. The need for an evidence-based approach to controlling opium production in Afghanistan. JOURNAL OF PUBLIC HEALTH POLICY 2008;29(4):440-448.

Williams S. On islands, insularity, and opium poppies: Australia's secret pharmacy. ENVIRONMENT AND PLANNING D: SOCIETY AND SPACE 2010;28(2):290-310.

Yadav HK, Shukla S, Singh SP. Assessment of genotype x environment interactions for yield and morphine content in opium poppy (Papaver somniferum L.). ACTA AGRONOMICA HUNGARICA 2007;55(3):331-338.

Yadav HK, Shukla S, Rastogi A, Singh SP. Assessment of diversity in new genetic stock of opium poppy (Papaver somniferum). INDIAN JOURNAL OF AGRICULTURAL SCIENCES 2007;77:537-539.

Yadav HK, Shukla S, Rastogi A, Singh SP. Non-parametric measure of stability for yield and morphine content in opium poppy (Papaver somniferum). INDIAN JOURNAL OF AGRICULTURAL SCIENCES 2007;77:596-599.

Yadav HK, Shulkla S, Rastogi A, Singh MP, Singh SP. Genotype - Environmental interactions and phenotypic stability analyses of opium poppy (Papaver somniferum L.) for seed, opium and morphine content. INDIAN JOURNAL OF GENETICS AND PLANT BREEDING 2007;67(2):166-168.

Zein AL, Dakhil OO, Dawe LN, Georghiou PE. Enantioselective syntheses and X-ray structures of (S)- and (R)-N-norlaudanidine: Trace opium constituents. TETRAHEDRON LETTERS 2010;51(1):177-180.

Zhang CJ, Cheng CG. Identification of Papaver somniferum L. and Papaver rhoeas using DSWT-FTIR-RBFNN. SPECTROSCOPY AND SPECTRAL ANALYSIS 2009;29(5):1255-1259.

Ziegler J, Facchini PJ, Geissler R, Schmidt J, Ammer C, Kramell R, Voigtlander S, Gesell A, Pienkny S, Brandt W. Evolution of morphine biosynthesis in opium poppy. PHYTOCHEMISTRY 2009;70(15-16):1696-1707.

Ziska L, Panicker S, Wojno H. Recent and projected increases in atmospheric carbon dioxide and the potential impacts on growth and alkaloid production in wild poppy (Papaver setigerum DC.). CLIMATIC CHANGE 2008;91(3-4):395-403.

Zulak KG, Khan MF, Alcantara J, Schriemer DC, Facchini PJ. Plant defense responses in opium poppy cell cultures revealed by liquid chromatography - tandem mass spectrometry proteomics. MOLECULAR & CELLULAR PROTEOMICS 2009;8(1):86-98.

Phenethylamines (including mixtures of Amphetamines, Methylenedioxy-amphetamines, and Related Compounds):

Awad T, DeRuiter J, Belal T, Clark CR. GC and mass spectral studies on acylated side chain regioisomers of 3-methoxy-4-methyl-phenethylamine and 4-methoxy-3-methyl-phenethylamine. JOURNAL OF CHROMATOGRAPHIC SCIENCE

2009;47(4):279-286.

Awad T, DeRuiter J, Clark CR. GC-MS analysis of acylated derivatives of a series of side chain regioisomers of 2-methoxy-4-methyl-phenethylamines. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2008;46(5):375-380.

Awad T, DeRuiter J, Clark CR. GC-MS analysis of ring and side chain regioisomers of ethoxyphenethylamines. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2008;46(8):671-679.

Kanai K, Takekawa K, Kumamoto T, Ishikawa T, Ohmori T. Simultaneous analysis of six phenethylamine-type designer drugs by TLC, LC-MS, and GC-MS. FORENSIC TOXICOLOGY 2008;26(1):6-12.

Min JZ, Shimizu Y, Toyo'oka T, Inagaki S, Kikura-Hanajiri R, Goda Y. Simultaneous determination of 11 designated hallucinogenic phenethylamines by ultra-fast liquid chromatography with fluorescence detection. JOURNAL OF CHROMATOGRAPHY B-ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2008;873(2):187-194.

Pellati F, Benvenuti S. Fast high-performance liquid chromatography analysis of phenethylamine alkaloids in citrus natural products on a pentafluorophenylpropyl stationary phase. JOURNAL OF CHROMATOGRAPHY A 2007;1165:58-66.

Schultz DM, Prescher JA, Kidd S, Marona-Lewicka D, Nichols DE, Monte A. 'Hybrid' benzofuran-benzopyran congeners as rigid analogs of hallucinogenic phenethylamines. BIOORGANIC & MEDICINAL CHEMISTRY 2008;16(11):6242-6251.

Thigpen AL, Awad T, DeRuiter J, Clark CR. GC-MS Studies on the regioisomeric methoxy-methyl-phenethylamines related to MDEA, MDMMA, and MBDB. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2008;46(10):900-906.

Westphal F, Roesner P, Junge T. Differentiation of regioisomeric ring-substituted fluorophenethylamines with product ion spectrometry. FORENSIC SCIENCE INTERNATIONAL 2010;194(1-3):53-59.

Piperazines:

Abdel-Hay KM, Awad T, DeRuiter J, Clark CR. Differentiation of methylenedioxy-

benzylpiperazines (MDBP) by GC-IRD and GC-MS. FORENSIC SCIENCE INTERNATIONAL 2010;195(1-3):78-85.

Elliott S, Smith C. Investigation of the first deaths in the United Kingdom involving the detection and quantitation of the piperazines BZP and 3-TFMPP. JOURNAL OF ANALYTICAL TOXICOLOGY 2008;32(2):172-177.

Heegel RA, Trigg JJ. Different approaches to the separation of 1-benzylpiperazine and 1-[3-(trifluoromethyl)phenyl]-piperazine found in illicit ecstasy tablets. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(3):9.

Johnstone AC, Lea RA, Brennan KA, Schenk S, Kennedy MA, Fitzmaurice PS. Benzylpiperazine: A drug of abuse? JOURNAL OF PSYCHOPHARMACOLOGY 2007;21(8):888-894.

Lanaro R, Costa JL, Zanolli LA, Cazenave SOS. Chemical identification of chlorophenylpiperazine in seized tablets. QUIMICA NOVA 2010;33(3):725-729.

Lecompte Y, Roussel O, Perrin M. 1-Benzylpiperazine (BZP) and 1-(3-trifluoromethyl-phenyl)piperazine (TFMPP): Emergence of two agents which lead to misuse. ANNALES PHARMACEUTIQUES FRANCAISES 2008;66(2):85-91.

Maher HM, Awad T, Clark CR. Differentiation of the regioisomeric 2-, 3-, and 4-trifluoromethylphenylpiperazines (TFMPP) by GC-IRD and GC-MS. FORENSIC SCIENCE INTERNATIONAL 2009;188(1-3):31-39.

Nikolova I, Danchev N. Piperazine based substances of abuse: A new party pill on Bulgarian drug market. BIOTECHNOLOGY & BIOTECHNOLOGICAL EQUIPMENT 2008;22(2):652-655.

Schafstall HJ, Burris MD, Kramer KL, Weston RG. Analytical data for ortho-, meta-,and para-chlorophenyl-piperazines (CPP). 2008 American Academy of Forensic Sciences Annual Meeting.

Sheridan J, Butler R. "They're legal so they're safe, right?" What did the legal status of BZP-party pills mean to young people in New Zealand? INTERNATIONAL JOURNAL OF DRUG POLICY 2010;21(1):77-81.

Staack RF. Piperazine designer drugs of abuse. LANCET 2007;369(9571):1411-1413.

Westphal F, Junge T, Girreser U, Stobbe S, Perez SB. Structure elucidation of a new designer benzylpiperazine: 4-Bromo-2,5-dimethoxybenzylpiperazine. FORENSIC SCIENCE INTERNATIONAL 2009;187(1-3):87-96.

Wilkins C, Sweetsur P. Differences in harm from legal BZP/TFMPP party pills between North Island and South Island users in New Zealand: A case of effective industry self-regulation? INTERNATIONAL JOURNAL OF DRUG POLICY 2010;21(1):86-90.

Wilkins C, Sweetsur P, Girling M. Patterns of benzylpiperazine / trifluoromethylphenyl-piperazine party pill use and adverse effects in a population sample in New Zealand. DRUG AND ALCOHOL REVIEW 2008;27(6):633-639.

Polydrug:

Laussmann T, Meier-Giebing S. Forensic analysis of hallucinogenic mushrooms and khat (Catha edulis Forsk) using cation-exchange liquid chromatography. FORENSIC SCIENCE INTERNATIONAL 2010;195(1-3):160-164.

Mori T, Ito S, Sawaguchi T. Survey on transactions of methamphetamine MDMA and methylphenidate in Japan: A study using the internet. INTERNATIONAL MEDICAL JOURNAL 2008;15(1):75-78.

Psilocybin Mushrooms, Psilocybin, and Psilocin:

Adamczyk A, Sadakierska-Chudy A, Janoszka J, Rymkiewicz A, Dobosz T. Hallucinogenic fungi (psilocybe). Part II. Identification of Psilocybe semilanceata by PCR. ARCH MED SADOWEJ KRYMINOLOGIA 2007;57(3):285.

Boissevain I. Psilocybin mushrooms. TIJDSCHRIFT VOOR DIERGENEESKUNDE 2008;133(8):343-343.

Guzman G. Hallucinogenic mushrooms in Mexico: An overview. ECONOMIC BOTANY 2008;62(3):404-412.

Guzman G, Gaines RV, Ramirez-Guillen F. New species of hallucinogenic Psilocybe (Fr.) P. Kumm. (Agaricomycetideae) from the eastern USA. INTERNATIONAL JOURNAL OF MEDICINAL MUSHROOMS 2007;9(1):75-77.

Guzman G, Kroeger P, Ramirez-Guillen F, Castillo-Del-Moral R. Psilocybe (Basidiomycotina, Agaricales, Strophariaceae) in Canada, with a special review of species from British Columbia. MYCOTAXON 2008;106:179-193.

Horak E, Guzman G, Desjardin DE. Four new species of Psilocybe from Malaysia and Thailand, with a key to the species of sect. Neocaledonicae and discussion on the distribution of the tropical and temperate species. SYDOWIA 2009;61(1):25-37.

Jiang G, Stenzel JR. Identification of psychotropic substances in mushrooms by UHPLC/MS. LC-GC NORTH AMERICA 2009;(Suppl.)13.

Kocak A, De Cotiis LM, Hoffman DB. Comparative study of ATR and transflection IR spectroscopic techniques for the analysis of hallucinogenic mushrooms. FORENSIC SCIENCE INTERNATIONAL 2010;195(1-3):36-41.

Lott JP, Marlowe DB, Forman RF. Availability of websites offering to sell psilocybin spores and psilocybin. JOURNAL OF PSYCHOACTIVE DRUGS 2009;41(3):305-307.

Rafati H, Riahi H, Mohammadi A. Enhancement of indole alkaloids produced by Psilocybe cubensis (Earle) Singer (Agaricomycetideae) in controlled harvesting light conditions. INTERNATIONAL JOURNAL OF MEDICINAL MUSHROOMS 2009;11(4):419-426.

Stenzel JR, Jiang G. Identification of psychotropic substances in mushrooms by UHPLC/MS. LC-GC NORTH AMERICA 2009;13.

***Salvia Divinorum*:**

Albertson DN, Grubbs LE. Subjective Effects of Salvia divinorum: LSD- or marijuana-like? JOURNAL OF PSYCHOACTIVE DRUGS 2009;41(3):213-217.

Carvalho P, Bikbulatov R, Zjawiony JK, Avery MA. Unusual hemiacetal structure derived from salvinorin A. ACTA CRYSTALLOGRAPHICA SECTION E-STRUCTURE REPORTS ONLINE 2008;64:O1370-U2878.

Griffin OH, Miller BL, Khey DN. Legally high? Legal considerations of Salvia divinorum. JOURNAL OF PSYCHOACTIVE DRUGS 2008;40(2):183-191.

Grundmann O, Phipps SM, Zadezensky I, Butterweck V. Salvia divinorum and

salvinorin A: An update on pharmacology and analytical methodology. PLANTA MEDICA 2007;73(10):1039-1046.

Holden KG, Tidgewell K, Marquam A, Rothman RB, Navarro H, Prisinzano TE. Synthetic studies of neoclerodane diterpenes from Salvia divinorum: Exploration of the 1-position. BIOORGANIC & MEDICINAL CHEMISTRY LETTERS 2007;17:6111-6115.

Jermain JD, Evans HK. Analyzing Salvia divinorum and its active ingredient salvinorin A utilizing thin layer chromatography and gas chromatography/mass spectrometry. JOURNAL OF FORENSIC SCIENCES 2009;54(3):612-616.

Kennedy JH, Wiseman JM. Direct analysis of Salvia divinorum leaves for salvinorin A by thin layer chromatography and desorption electrospray ionization multi-stage tandem mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2010;24(9):1305-1311.

Kutrzeba LM, Ferreira D, Zjawiony JK. Salvinorins J from Salvia divinorum: Mutarotation in the neoclerodane system. JOURNAL OF NATURAL PRODUCTS 2009;72(7):1361-1363.

Maruyama T, Kamakura H, Kikura-Hanajiri R, Goda Y. Authentication and ultra performance liquid chromatography (UPLC)/MS analysis of magic mint, Salvia divinorum and its related plants. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(1):179-183.

Shirota O, Nagamatsu K, Sekita S. Simple preparative isolation of salvinorin A from the hallucinogenic sage, Salvia divinorum, by centrifugal partition chromatography. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2007;30(5-8):1105-1114.

Simpson DS, Lovell KM, Lozama A, Han N, Day VW, Dersch CM, Rothman RB, Prisinzano TE. Synthetic studies of neoclerodane diterpenes from Salvia divinorum: Role of the furan in affinity for opioid receptors. ORGANIC & BIOMOLECULAR CHEMISTRY 2009;7(18):3748-3756.

Tsujikawa K, Kuwayama K, Miyaguchi H, Kanamori T, Iwata YT, Yoshida T, Inoue H. Determination of salvinorin A and salvinorin B in Salvia divinorum-related products circulated in Japan. FORENSIC SCIENCE INTERNATIONAL 2008;180(2-3):105-109.

Zhang Y, Chen H, Cheng W, Feng Y, Tang Z, Yang L. Studies on the chemical constituents of Salvia miltiorrhiza of Lijiang. ZHONGYAOCAI 2008;31(2):226-229.

Scopolamine:

Henderson TJ, Cullinan DB, Lawrence RJ, Oyler JM. Positive identification of the principal component of a white powder as scopolamine by quantitative one-dimensional and two-dimensional NMR techniques. JOURNAL OF FORENSIC SCIENCES 2008;53(1):151-161.

Yuan BQ, Zheng CY, Teng H, You TY. Simultaneous determination of atropine, anisodamine, and scopolamine in plant extract by nonaqueous capillary electrophoresis coupled with electrochemiluminescence and electrochemistry dual detection. JOURNAL OF CHROMATOGRAPHY A 2010;1217(1):171-174.

Steroids:

Blokland MH, Zoontjes PW, Sterk SS, Stephany RW, Zweigenbaum J, van Ginkel LA. Confirmatory analysis of trenbolone using accurate mass measurement with LC/TOF-MS. ANALYTICA CHIMICA ACTA 2008;618(1):86-93.

Fragkaki AG, Angelis YS, Tsantili-Kakoulidou A, Koupparis M, Georgakopoulos C. Statistical analysis of fragmentation patterns of electron ionization mass spectra of enolized-trimethylsilylated anabolic androgenic steroids. INTERNATIONAL JOURNAL OF MASS SPECTROMETRY 2009;285(1-2):58-69.

Galesio M, Rial-Otero R, Capelo-Martinez JL. Comparative study of matrices for their use in the rapid screening of anabolic steroids by matrix-assisted laser desorption / ionization time-of-flight mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(12):1783-1791.

Hadef Y, Kaloustian J, Portugal H, Nicolay A. Multivariate optimization of a derivatisation procedure for the simultaneous determination of nine anabolic steroids by gas chromatography coupled with mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2008;1190(1-2):278-285.

Kauppila TJ, Talaty N, Jackson AU, Kotiaho T, Kostiainen R, Cooks RG. Carbohydrate and steroid analysis by desorption electrospray ionization mass spectrometry. CHEMICAL COMMUNICATIONS 2008;(23):2674-2676.

Morris JA, Minor RG. Confirmation of anabolic steroids by alkaline hydrolysis. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(3):2.

Muniz-Valencia R, Gonzalo-Lumbreras R, Santos-Montes A, Izquierdo-Hornillos R. Liquid chromatographic method development for anabolic steroids using a monolithic column. ANALYTICA CHIMICA ACTA 2008;611(1):103-112.

Nie J, Wu H, Wang X, Zhang Y, Zhu S, Yu R. Determination of testosterone propionate in cosmetics using excitation-emission matrix fluorescence based on oxidation derivatization with the aid of second-order calibration methods. ANALYTICA CHIMICA ACTA 2008;628(1):24-32.

Parr MK, Zapp J, Becker M, Opfermann G, Bartz U, Schaenzer W. Steroidal isomers with uniform mass spectra of their per-TMS derivatives: Synthesis of 17-hydroxy-androstan-3-ones, and rost-1-, and -4-ene-3,17-diols. STEROIDS 2007;72(6-7):545-551.

Pozo OJ, Van Eenoo P, Deventer K, Delbeke FT. Detection and characterization of anabolic steroids in doping analysis by LC-MS. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2008;27(8):657-671.

Pozo OJ, Van Eenoo P, Deventer K, Delbeke FT. Ionization of anabolic steroids by adduct formation in liquid chromatography electrospray mass spectrometry. JOURNAL OF MASS SPECTROMETRY 2007;42(4):497-516.

Saudan C, Emery C, Marclay F, Strahm E, Mangin P, Saugy M. Validation and performance comparison of two carbon isotope ratio methods to control the misuse of androgens in humans. JOURNAL OF CHROMATOGRAPHY B - ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2009;877(23):2321-2329.

Shi Y-Q, Yao J, Liu F, Hu C-Q, Yuan J, Zhang Q-M, Jin S-H. Establishment of an HPLC identification system for detection of counterfeit steroidal drugs. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;46(4):663-669.

Silva AI, Pereira HMG, Casilli A, Conceicao FC, Neto FRA. Analytical challenges in doping control: Comprehensive two-dimensional gas chromatography with time of flight mass spectrometry, a promising option. JOURNAL OF CHROMATOGRAPHY A 2009;1216(14):2913-2922.

Stepan R, Cuhra P, Barsova S. Comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometric detection for the determination of anabolic steroids and related compounds in nutritional supplements. FOOD ADDITIVES & CONTAMINANTS, PART A: CHEMISTRY, ANALYSIS, CONTROL, EXPOSURE & RISK ASSESSMENT 2008;25(5):557-565.

Verheyden K, Le Bizec B, Courtheyn D, Mortier V, Vandewiele M, Gillis W, Vanthemsche P, De Brabander HF, Noppe H. Mass spectrometric detection of and similarities between 1-androgens. ANALYTICA CHIMICA ACTA 2007;586(1-2):57.

Walker CJ, Cowan DA, James VH, Lau JC, Kichman AT. Doping in sport-2. Quantification of the impurity 19-norandrostenedione in pharmaceutical preparations of norethisterone. STEROIDS 2009;74(3):335-340.

Yuan B. Feature analysis and future perspective of designer steroid. TIANJIN TIYU XUEYUAN XUEBAO 2007;22(5):422-425.

Yuan Y, Xu C, Peng C, Jin Z, Chen W, Liu L. Analytical methods for the detection of corticosteroids-residues in animal-derived foodstuffs. CRITICAL REVIEWS IN ANALYTICAL CHEMISTRY 2008;38(4):227-241.

Zhang Y, Tobia HJ, Brenna JT. Steroid isotopic standards for gas chromatography - combustion isotope ratio mass spectrometry (GCC-IRMS). STEROIDS 2009;74(3):369-378.

Synthetic Cannabimimetics (Also "Spice"):

Atwood BK, Huffman J, Straiker A, Mackie K. JWH018, a common constituent of 'Spice' herbal blends, is a potent and efficacious cannabinoid CB1 receptor agonist. BRITISH JOURNAL OF PHARMACOLOGY 2010;160(3):585-593.

Auwaerter V, Dresen S, Weinmann W, Mueller M, Puetz M, Ferreiros N. 'Spice' and other herbal blends: Harmless incense or cannabinoid designer drugs? JOURNAL OF MASS SPECTROMETRY 2009;44(5):832-837.

Auwaerter V. Structure elucidation of synthetic materials in "Spice." LABORPRAXIS 2009;33(6):62-64.

Combs M, Morris JA. Analytical profile of two synthetic cannabinoids - JWH-018 and

JWH-073. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(2):2.

Griffiths P, Sedefov R, Gallegos A, Lopez D. How globalization and market innovation challenge how we think about and respond to drug use: 'Spice' a case study. ADDICTION 2010;105(6):951-953.

Hammersley R. Dangers of banning spice and the synthetic cannabinoid agonists. ADDICTION 2010;105(2):373-373.

Hermanns-Clausen M, Sauer O, Gerber G, Faerber E, Koch IE, Hentschel H, Seidel C, Stedtler U, Auwarter V. New "Herbal Drugs" of abuse: Spice and Smoke. CLINICAL TOXICOLOGY 2009;47(5):57-.

Lindigkeit R, Boehme A, Eiserloh I, Luebbecke M, Wiggermann M, Ernst L, Beuerle T. Spice: A never ending story? FORENSIC SCIENCE INTERNATIONAL 2009;191(1-3):58-63.

Mustata C, Torrens M, Pardo R, Perez C, Farre M. Spice drugs: Cannabinoids as new designer drugs. ADICCIONES 2009;21(3):181-186.

Piggee C. Investigating a not-so-natural high: Researchers identify synthetic cannabinoids in herbal incense. ANALYTICAL CHEMISTRY 2009;81(9):3205-3207.

Uchiyama N, Kikura-Hanajiri R, Kawahara N, Goda Y. Identification of a cannabimimetic indole as a designer drug in a herbal product. FORENSIC TOXICOLOGY 2009;27(2):61-66.

Uchiyama N, Kikura-Hanajiri R, Kawahara N, Haishima Y, Goda Y. Identification of a cannabinoid analog as a new type of designer drug in a herbal product. CHEMICAL & PHARMACEUTICAL BULLETIN 2009;57(4):439-441.

Uchiyama N, Kikura-Hanajiri R, Ogata J, Goda Y. Chemical analysis of synthetic cannabinoids as designer drugs in herbal products. FORENSIC SCIENCE INTERNATIONAL 2010;198(1-3):31-38.

Zimmermann US, Winkelmann PR, Pilhatsch M, Nees JA, Spanagel R, Schulz K. Withdrawal phenomena and dependence syndrome after the consumption of "Spice Gold". DEUTSCHES ARZTEBLATT INTERNATIONAL 2009;106(27):464-467.

(Designer) Tryptamines (see also Psilocybin):

Brandt SD, Martins CPB, Freeman S, Dempster N, Riby PG, Gartz J, Alder JF. Halogenated solvent interactions with N,N-dimethyltryptamine: Formation of quaternary ammonium salts and their artificially induced rearrangements during analysis. FORENSIC SCIENCE INTERNATIONAL 2008;178(2-3):162-170.

Brandt SD, Martins CPB, Freeman S, Dempster N, Wainwright M, Riby PG, Alder JF. N,N-Dimethyltryptamine and dichloromethane: Rearrangement of quaternary ammonium salt product during GC-EI and CI-MS-MS analysis. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;47(1):207-212.

Buchanan MS, Carroll AR, Pass D, Quinn RJ. NMR spectral assignments of a new chlorotryptamine alkaloid and its analogues from Acacia confusa. MAGNETIC RESONANCE IN CHEMISTRY 2007;45(4):359-361.

Cason TD. Mass spectra of designer drugs. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(2):8.

Chen BH, Liu JT, Chen WX, Chen HM, Lin CH. A general approach to the screening and confirmation of tryptamines and phenethylamines by mass spectral fragmentation. TALANTA 2008;74(4):512-517.

Fasanello JA, Placke AD. The isolation, identification, and quantitation of dimethyltryptamine (DMT) in Mimosa hostilis. MICROGRAM JOURNAL 2007;5(1-4):41-50.

Gambelunghe C, Aroni K, Rossi R, Moretti L, Bacci M. Identification of N,N-dimethyltryptamine and beta-carbolines in psychotropic ayahuasca beverage. BIOMEDICAL CHROMATOGRAPHY 2008;22(10):1056-1059.

Hsiao Y, Liu JT, Lin CH. Simultaneous separation and detection of 18 phenethylamine / tryptamine derivatives by liquid chromatography-UV absorption and electrospray ionization mass spectrometry. ANALYTICAL SCIENCES 2009;25(6):759-763.

Kamata T, Katagi M, Tsuchihashi H. Metabolism and toxicological analyses of hallucinogenic tryptamine analogues being abused in Japan. FORENSIC TOXICOLOGY 2010;28(1):1-8.

Martins CPB, Awan MA, Freeman S, Herraiz T, Alder JF, Brandt SD. Fingerprint analysis of thermolytic decarboxylation of tryptophan to tryptamine catalyzed by natural oils. JOURNAL OF CHROMATOGRAPHY A 2008;1210(1):115-120.

Martins CPB, Freeman S, Alder JF, Passie T, Brandt SD. Profiling psychoactive tryptamine-drug synthesis by focusing on detection using mass spectrometry. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2010;29(4):285-296.

Martins CPB, Freeman S, Alder JF, Brandt SD. Characterisation of a proposed internet synthesis of N,N-dimethyltryptamine using liquid chromatography/electrospray ionisation tandem mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2009;1216(33):6119-6123.

McIlhenny EH, Pipkin KE, Standish LJ, Wechkin HA, Strassman R, Barker SA. Direct analysis of psychoactive tryptamine and harmala alkaloids in the Amazonian botanical medicine ayahuasca by liquid chromatography-electrospray ionization-tandem mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2009;1216(51):8960-8968.

Nakamoto A, Namera A, Yahata M, Kuramoto T, Nishida M, Yashiki M. A systematic toxicological analysis for hallucinogenic tryptamines in seized and biological materials. HIROSHIMA DAIGAKU IGAKU ZASSHI 2007;55(1-3):1-14.

Ouyang YZ, Liang YZ, Li SH, Luo X, Zhang LX, Tang ZH, Xu XN. Interpretation of the characteristic fragmentation mechanisms through determining the initial ionization site by natural spin density: A study on the derivatives of tryptophan and tryptamine. INTERNATIONAL JOURNAL OF MASS SPECTROMETRY 2009;286(2-3):112-121.

Pichini S, Pujades M, Marchei E, Pellegrini M, Fiz J, Pacifici R, Zuccaro P, Farre M, de la Torre R. Liquid chromatography-atmospheric pressure ionization electrospray mass spectrometry determination of "hallucinogenic designer drugs" in urine of consumers. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;47(2):335-342.

Runguphan W, Maresh JJ, O'Connor SE. Silencing of tryptamine biosynthesis for production of nonnatural alkaloids in plant culture. PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA 2009;106(33):13673-13678.

Salum Pires AP, Rodrigues De Oliveira CD, Moura S, Doerr FA, Silva WAE, Yonamine

M. Gas chromatographic analysis of dimethyltryptamine and beta-carboline alkaloids in ayahuasca, an amazonian psychoactive plant beverage. PHYTOCHEMICAL ANALYSIS 2009;20(2):149-153.

Takahashi M, Nagashima M, Suzuki J, Seto T, Yasuda I, Yoshida T. Creation and application of psychoactive designer drugs data library using liquid chromatography with photodiode array spectrophotometry detector and gas chromatography-mass spectrometry. TALANTA 2009;77(4):1245-1272.

Takahashi M, Nagashima M, Suzuki J, Seto T, Yasuda I, Yoshida T. Analysis of phenethylamines and tryptamines in designer drugs using gas chromatography-mass spectrometry. JOURNAL OF HEALTH SCIENCE 2008;54(1):89-96.

Uchiyama N, Kikura-Hanajiri R, Kawahara N, Goda Y. Analysis of designer drugs detected in the products purchased in fiscal year 2006. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2008;128(10):1499-1505.

Uchiyama N, Miyazawa N, Kawamura M, Kikura-Hanajiri R, Goda Y. Analysis of newly distributed designer drugs detected in the products purchased in fiscal year 2008. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2010;130(2):263-270.

Wang M-J, Liu J-T, Chen H-M, Lin J-J, Lin C-H. Comparison of the separation of nine tryptamine standards based on gas chromatography, high performance liquid chromatography and capillary electrophoresis methods. JOURNAL OF CHROMATOGRAPHY A 2008;1181(1-2):131-136.

Wang MJ, Tsai CH, Hsu WY, Liu JT, Lin CH. Optimization of separation and online sample concentration of N,N-dimethyltryptamine and related compounds using MEKC. JOURNAL OF SEPARATION SCIENCE 2009;32(3):441-445.

Westphal F, Junge T, Roesner P, Fritschi G, Klein B, Girreser U. Mass spectral and NMR spectral data of two new designer drugs with an alpha-aminophenone structure: 4'-Methyl-alpha-pyrrolidinohexanophenone and 4'-methyl-alpha-pyrrolidinobutyrophenone. FORENSIC SCIENCE INTERNATIONAL 2007;169(1):32.

Wolf EU, Raziel A, Katz Y. The "periodic table" of designer drugs in Israel. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS

ASSOCIATION 2008;20(2):19-20.

Zaitsu K, Katagi M, Kamata T, Kamata H, Shima N, Tsuchihashi H, Hayashi T, Kuroki H, Matoba R. Determination of a newly encountered designer drug "p-methoxyethyl-amphetamine" and its metabolites in human urine and blood. FORENSIC SCIENCE INTERNATIONAL 2008;177(1):77-84.

Zaleplon:

Bharathi C, Prabahar KJ, Prasad CS, Kumar MS, Magesh S, Handa VK, Dandala R, Naidu A. Impurity profile study of Zaleplon. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2007;44(1):101-109.

Metwally FH, Abdelkawy M, Abdelwahab NS. Application of spectrophotometric, densitometric, and HPLC techniques as stability indicating methods for determination of Zaleplon in pharmaceutical preparations. SPECTROCHIMICA ACTA PART A - MOLECULAR AND BIOMOLECULAR SPECTROSCOPY 2007;68(5):1220-1230.

Radl S, Blahovcova M, Placek L, Pekarek T, Havlicek J. Synthesis of some impurities and/or degradation products of Zaleplon. JOURNAL OF HETEROCYCLIC CHEMISTRY 2010;47(2):276-283.

Zolpidem:

Emshanova SV, Veselova NI, Zuev AP, Sadchikova NP. Direct molding technology for the production of Zolpidem tablets. KHIMIKO-FARMATSEVTICHESKII ZHURNAL 2007;41(12):37-39.

Halasz I, Dinnebier RE. Structural and thermal characterization of Zolpidem hemitartrate hemihydrate (form e) and its decomposition products by laboratory X-ray powder diffraction. JOURNAL OF PHARMACEUTICAL SCIENCES 2010;99(2):871-878.

Owen RT. Novel Zolpidem formulations. DRUGS OF TODAY 2009;45(5):395-400.

Pushpalatha P, Sarin RK, Rao MA, Baggi TRR. A new thin-layer chromatographic method for analysis of Zolpidem and Zopiclone. JPC - JOURNAL OF PLANAR CHROMATOGRAPHY-MODERN TLC 2009;22(6):449-451.

Sumalatha Y, Reddy PP, Reddy R, Satyanarayana B. Synthesis and spectral

characterization of process-related substances to the hypnotic agent Zolpidem. ARKIVOC 2009;143-149.

Sumalatha Y, Reddy TR, Reddy PP, Satyanarayana B. A simple, efficient and scalable synthesis of hypnotic agent, Zolpidem. ARKIVOC 2009;315-320.

Zopiclone:

Gomis DB, Velasco CB, Sanchez IH, Alvarez MDG. Optimization by factorial design of a capillary electrophoresis method for the chiral resolution and determination of Zopiclone and its synthesis precursor. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2009;32(18):2654-2668.

Chen YY, Liu JJ, Tang KW. Study on inclusion complexes of beta-cyclodextrin with Zopiclone. SPECTROSCOPY AND SPECTRAL ANALYSIS 2008;28(10):2380-2383.

Jerussi TP, Fang QK. Compositions comprising Zopiclone derivatives and methods of making and using the same. PN US 07456173 AE Sepracor Inc. Official Gazette of the United States Patent and Trademark Office Patents 2008.

Sangaraju S, Kanth ML, Rao BM, Someswararao N. Enantiomeric separation of S-Zopiclone and its R-enantiomer in bulk drug samples by validated chiral RP-HPLC. PHARMAZIE 2009;64(11):717-719.

Yilmaz S. Adsorptive stripping voltammetric determination of Zopiclone in tablet dosage forms and human urine. COLLOIDS AND SURFACES B: BIOINTERFACES 2009;71(1):79-83.

Miscellaneous:

Suzuki J, Takahashi M, Nagashima M, Seto T, Mori K, Ogino S. Determination of chloral hydrate in unapproved/unpermitted drugs. TOKYO-TO KENKO ANZEN KENKYU SENTA KENKYU NENPO 2009;59:79-84.

Tcheremissine OV. Is quetiapine a drug of abuse? Reexamining the issue of addiction. EXPERT OPINION ON DRUG SAFETY 2008;7(6):739-48.

II) Synthesis and/or Cultivation of Abused Substances, their Precursors, and Essential Chemicals

Issue:

Forensic chemists must maintain familiarity with existing and new clandestine syntheses of abused substances, their precursors, and essential chemicals, and with the cultivation of abused natural products, in order to assist enforcement activities, to ensure safety and effectiveness during enforcement operations, and to provide expert testimony in legal proceedings.

Solution:

Illicit drug seizures, clandestine laboratory operations, and illicit grow operations, are continuously monitored to maintain a comprehensive overview of the field. In cases where new drugs are synthesized, or new methodologies are utilized, case reports are generated for the forensic and enforcement communities.

References:

Production of Abused Substances and/or their Precursors and Essential Chemicals:

Alacid E, Najera C. Regioselective Heck reaction of N-vinylphthalimide: A general strategy for the synthesis of (E)-N-styrylphthalimides and phenethylamines. ADVANCED SYNTHESIS & CATALYSIS 2008;350(9):1316-1322.

Allwein SP, McWilliams JC, Secord EA, Mowrey DR, Nelson TD, Kress MH. Efficient synthesis of chiral phenethylamines: Preparation, asymmetric hydrogenation, and mild deprotection of ene-trifluoroacetamides. TETRAHEDRON LETTERS 2006;47:6409-6412.

Barreto RD, Nascimbem LBLR, Correia CRD. Synthesis of the 3-(3,4,5-trimethoxy-phenyl)pyrrolidine: A new conformationally constrained mescaline analogue. SYNTHETIC COMMUNICATIONS 2007;37:2011-2018.

Bergman YE, Mulder R, Perlmutter P. Total synthesis of 20-norsalvinorin A. 1. Preparation of a key intermediate. JOURNAL OF ORGANIC CHEMISTRY 2009;74(6):2589-2591.

Bikbulatov RV, Stewart J, Jin WT, Yan F, Roth BL, Ferreira D, Zjawiony JK. Short synthesis of a novel class of salvinorin A analogs with hemiacetalic structure.

TETRAHEDRON LETTERS 2008;49(6):937-940.

Brandt SD, Tirunarayanapuram SS, Freeman S, Dempster N, Barker SA, Daley PF, Cozzi NV, Martins CPB. Microwave-accelerated synthesis of psychoactive deuterated N,N-dialkylated-[alpha,alpha,beta,beta-d(4)]-tryptamines. JOURNAL OF LABELLED COMPOUNDS AND RADIOPHARMACEUTICALS 2008;51(13-14):423-429.

Carroll RJ, Leisch H, Rochon L, Hudlicky T, Cox DP. One-pot conversion of thebaine to hydrocodone and synthesis of neopinone ketal. JOURNAL OF ORGANIC CHEMISTRY 2009;74(4):1812-1812.

Chen YW, Gao MZ, Tan SD, Reibenspies JH, Zingaro RA. Synthesis and structures of new C-2-symmetrical chiral macrocycles containing the ephedrine moiety. HETEROCYCLES 2009;78(4):891-897.

Cloonan SM, Keating JJ, Corrigan D, O'Brien JE, Kavanagh PV, Williams DC, Meegan MJ. Synthesis and in vitro toxicity of 4-MTA, its characteristic clandestine synthesis byproducts and related sulfur substituted alpha-alkylthioamphetamines. BIOORGANIC & MEDICINAL CHEMISTRY 2010;18(11):4009-4031.

Coote SJ, Davies SG, Fletcher AM, Roberts PM, Thomson JE. Enantiospecific stereodivergent synthesis of trans- and cis-N(2),3-dimethyl-4-phenyl-1,2,3,4-tetrahydroisoquinolines. CHEMISTRY-AN ASIAN JOURNAL 2010;5(3):589-604.

Cox M. The source of tolualdehyde derived oxazolidines in clandestine laboratory samples. AUSTRALIAN JOURNAL OF FORENSIC SCIENCES 2008;40(2):161-170.

Cox M, Klass G, Wei Min Koo C. Forensic aspects of the biotransformation of benzaldehyde used in the synthesis of methamphetamine, Part 1: Reaction conditions, stereochemical outcomes, and the use of other substituted benaldehydes. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(4):23.

Dal Cason TA. Synthesis and identification of N,N-dimethylcathinone hydrochloride. MICROGRAM JOURNAL 2007;5(1-4):3-12.

Davis SF, Culshaw PN, Wermuth UD. The production of phenyl-2-propanone from benzaldehyde via a Baeyer-Villiger reaction. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):28.

Edwankar CR, Edwankar RV, Namjoshi OA, Rallapalli SK, Yang J, Cook JM. Recent progress in the total synthesis of indole alkaloids. CURRENT OPINION IN DRUG DISCOVERY & DEVELOPMENT 2009;12(6):752-771.

Gould C. Iodine recovery from povidone-iodine solutions and its use in clandestine methamphetamine synthesis. 2008 American Academy of Forensic Sciences Annual Meeting.

Groeper JA, Eagles JB, Hitchcock SR. A facile, one-pot synthesis of Ephedra-based aziridines. TETRAHEDRON-ASYMMETRY 2009;20(17):1969-1974.

Guizzetti S, Benaglia M, Biaggi C, Celentano G. A convenient, highly stereoselective, metal-free synthesis of chiral amines. SYNLETT 2010;(1):134-136.

Guy M, Freeman S, Alder JF, Brandt SD. The Henry reaction: Spectroscopic studies of nitrile and hydroxylamine by-products formed during synthesis of psychoactive phenylalkylamines. CENTRAL EUROPEAN JOURNAL OF CHEMISTRY 2008;6(4):526-534.

Hagiwara H, Nozawa M. Highly oxygenated diterpenoids associated to the central nervous system: Syntheses of salvinorin and forskolin. JOURNAL OF SYNTHETIC ORGANIC CHEMISTRY JAPAN 2009;67(11):1115-1124.

Hagiwara H, Suka Y, Nojima T, Hoshi T, Suzuki T. Second-generation synthesis of salvinorin A. TETRAHEDRON 2009;65(25):4820-4825.

Hu CM, Qin H, Cui YX, Jia YX. Palladium-catalyzed synthesis of tryptamines and tryptamine homologues: Synthesis of psilocin. TETRAHEDRON 2009;65(45):9075-9080.

Inuki S, Oishi S, Fujii N, Ohno H. Total synthesis of (+/-)-lysergic acid, lysergol, and isolysergol by palladium-catalyzed domino cyclization of amino allenes bearing a bromoindolyl group. ORGANIC LETTERS 2008;10(22):5239-5242.

Kesharwani S, Sahu NK, Kohli DV. Synthesis and biological evaluation of some new spiro derivatives of barbituric acid. PHARMACEUTICAL CHEMISTRY JOURNAL 2009;43(6):315-319.

Kok G, Ashton TD, Scammells PJ. An improved process for the N-demethylation of

opiate alkaloids using an iron(ii) catalyst in acetate buffer. ADVANCED SYNTHESIS & CATALYSIS 2009;351(1-2):283-286.

Kurokawa T, Isomura M, Tokuyama H, Fukuyama T. Synthesis of lysergic acid methyl ester via the double cyclization strategy. SYNLETT 2009;(5):775-778.

Lozama A, Prisinzano TE. Chemical methods for the synthesis and modification of neoclerodane diterpenes. BIOORGANIC & MEDICINAL CHEMISTRY LETTERS 2009;19(18):5490-5495.

Ma J, Yin WY, Zhou H, Liao XB, Cook JM. General approach to the total synthesis of 9-methoxy-substituted indole alkaloids: Synthesis of mitragynine, as well as 9-methoxy-geissoschizol and 9-methoxy-N-b-methylgeissoschizol. JOURNAL OF ORGANIC CHEMISTRY 2009;74(1):264-273.

Ma ZZ, Lee DYW. Synthesis of deacetyl-1,10-didehydrosalvinorin G. TETRAHEDRON LETTERS 2008;49(11):1782-1785.

Magnus P, Sane N, Fauber BP, Lynch V. Concise syntheses of (-)-galanthamine and (+/)-codeine via intramolecular alkylation of a phenol derivative. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2009;131(44):16045.

Mayo E, Coxon A, Johnson C. The reduction of pseudoephedrine to methamphetamine using phosphorous acid and iodine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(3):30.

Michaelis DJ, Dineen TA. Ring opening of aziridines with ortho-bromophenyl metal reagents: Synthesis of 2-substituted indolines. TETRAHEDRON LETTERS 2009;50(17):1920-1923.

Nicolaou KC, Krasovskiy A, Majumder U, Trepanier VE, Chen DYK. New synthetic technologies for the construction of heterocycles and tryptamines. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2009;131(10):3690-3699.

Nicolaou KC, Krasovskiy A, Trepanier VE, Chen DYK. An expedient strategy for the synthesis of tryptamines and other heterocycles. ANGEWANDTE CHEMIE - INTERNATIONAL EDITION 2008;47(22):4217-4220.

Norman K. The synthesis of amphetamine and methamphetamine: A "big" picture.

JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(3):10-29.

Nozawa M, Suka Y, Hoshi T, Suzuki T, Hagiwara H. Total synthesis of the hallucinogenic neoclerodane diterpenoid salvinorin A. ORGANIC LETTERS 2008;10(7):1365-1368.

Painter B, Pigou PE, W.M. Koo C. The Willgerodt-Kindler reaction. Part 1: Styrene to methamphetamine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(4):53.

Pan ZR, Zheng HG, Wang TW, Song Y, Li YZ, Guo ZJ, Batten SR. Hydrothermal synthesis, structures, and physical properties of four new flexible multicarboxylate ligands-based compounds. INORGANIC CHEMISTRY 2008;47(20):9528-9536.

Pearson JR, Reid EF, Rowe JE. The preparation of y-butyrolactone from readily available starting materials. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(1):8.

Refat MS, EI-Korashy SA, Ahmed AS. A convenient method for the preparation of barbituric and thiobarbituric acid transition metal complexes. SPECTROCHIMICA ACTA PART A - MOLECULAR AND BIOMOLECULAR SPECTROSCOPY 2008;71(3):1084-1094.

Scheerer JR, Lawrence JF, Wang GC, Evans DA. Asymmetric synthesis of salvinorin A, a potent kappa opioid receptor agonist. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2007;129:8968.

Sengmany S, Le Gall E, Le Jean C, Troupel M, Nedelec JY. Straightforward three-component synthesis of diarylmethylpiperazines and 1,2-diarylethylpiperazines. TETRAHEDRON 2007;63:3672-3681.

Stork G, Yamashita A, Adams J, Schulte GR, Chesworth R, Miyazaki Y, Farmer JJ. Regiospecific and stereoselective syntheses of (+/-) morphine codeine and thebaine via a highly stereocontrolled intramolecular 4+2 cycloaddition leading to a phenanthrofuran system. JOURNAL OF THE AMERICAN CHEMICAL SOCIETY 2009;131(32):11402-11406.

Toske SG, Hays PA, Geer BL. The synthesis and identification of

N-acetylpseudoephedrine and N-acetylephedrine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(2):8.

Walker AR, Love DW, Bordelon JA. Phosphorous acid flakes used as a substitute for red phosphorus in the reduction of (pseudo)ephedrine to methamphetamine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;20(2):14.

Yamauchi T, Hagiwara S, Higashiyama K. Concise total synthesis of (-)-deoxocuscohygrine and (-)-dihydrocuscohygrine. JOURNAL OF ORGANIC CHEMISTRY 2008;73(24):9784-9787.

Yan F, Bikbulatov RV, Mocanu V, Dicheva N, Parker CE, Wetsel WC, Mosier PD, Westkaemper RB, Allen JA, Zjawiony JK, Roth BL. Structure-based design, synthesis, and biochemical and pharmacological characterization of novel salvinorin a analogues as active state probes of the kappa-opioid receptor. BIOCHEMISTRY 2009;48(29):6898-6908.

Yang L, Xu W, Chen F, Liu-Chen LY, Ma ZZ, Lee DYW. Synthesis and biological evaluation of C-12 triazole and oxadiazole analogs of salvinorin A. BIOORGANIC & MEDICINAL CHEMISTRY LETTERS 2009;19(5):1301-1304.

Yun H, Kim BG. Enzymatic production of (R)-phenylacetylcarbinol by pyruvate decarboxylase from Zymomonas mobilis. BIOTECHNOLOGY AND BIOPROCESS ENGINEERING 2008;13(3):372-376.

Zhang L, Ding ZY, Shi GY. Asymmetric biosynthesis of (1S,2S)-ephedrine by Morganella morganii CMCC(B)49208. AFRICAN JOURNAL OF BIOTECHNOLOGY 2009;8(4):694-698.

III) Clandestine Laboratories - Appraisals and Safety

Issue:

Forensic chemists must maintain familiarity with clandestine laboratory procedures, setups, and techniques in order to assist enforcement activities, to ensure safety and effectiveness during enforcement operations, and in order to provide expert testimony in court proceedings.

Solution:

Clandestine laboratory operations are continuously reviewed to provide a comprehensive overview of the field. In cases where new methodologies are noted, or unusual safety concerns are salient, reports are generated for the forensic and enforcement communities.

References:

Coxon A, McLeay N, Ranaweera N. Development of scene examination software for clandestine drug laboratory scenes. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):23.

Coxon A. The cost of "p-lab" callouts. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):10.

MacFarlane KJ, Neely IJ. Identification of hypophosphorous and hydrochloric acid mixtures encountered at clandestine laboratories. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(2):16.

Man G, Stoeber B, Walus K. An assessment of sensing technologies for the detection of clandestine methamphetamine drug laboratories. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):1-13.

Montefusco V. An improved scent transfer device for collecting evidence at a crime scene. U.S. Pat. Appl. Publ. US 2008 87,110.

Norman K. Improvised containers used for hydrogen chloride gas generation at a clandestine drug laboratory. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(3):17.

Solomon KR, Anadon A, Brain RA, Cerdeira AL, Crossan AN, Marshall J, Sanin LH, Smith L. Comparative hazard assessment of the substances used for production and control of coca and poppy in colombia. RATIONAL ENVIRONMENTAL

MANAGEMENT OF AGROCHEMICALS: RISK ASSESSMENT, MONITORING, AND REMEDIAL ACTION 2007;966:87-99.

Solomon KR, Marshall EJP. Production of illicit drugs, the environment, and human health. JOURNAL OF TOXICOLOGY AND ENVIRONMENTAL HEALTH - PART A - CURRENT ISSUES 2009;72(15-16):913-913.

Wong L, Sannerud C, Carr S. Clandestine laboratory, synthetic drugs and precursor chemicals trends in the United States over a seven year period, 2001-2007. 2008 American Academy of Forensic Sciences Annual Meeting.

Clandestine Laboratory Appraisals and Safety:

Abdullah AFL, Miskelly GM. Recoveries of trace pseudoephedrine and methamphetamine residues from impermeable household surfaces: Implications for sampling methods used during remediation of clandestine methamphetamine laboratories. TALANTA 2010;81(1-2):455-461.

Cotner J, Cole B, Healy J. Quantitative comparison of common decontamination methods. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):6.

McLeod V, Ketcham G. The safety guys: Introduction to clandestine drug laboratories - A serious health and safety concern. FORENSIC MAGAZINE 2007;4(3):48.

Patrick G, Daniell W, Treser C. Residual methamphetamine in decontaminated clandestine drug laboratories. JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE 2009;6(3):151-156.

VanDyke M, Erb N, Arbuckle S, Martyny J. A 24-hour study to investigate persistent chemical exposures associated with clandestine methamphetamine laboratories. JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE 2009;6(2):82-89.

Safety Issues - Case Reports:

Burge M, Hunsaker JC, Davis GJ. Death of a toddler due to ingestion of sulfuric acid at a clandestine home methamphetamine laboratory. JOURNAL OF BIOLOGICAL CHEMISTRY 2010;285(2):298-301.

Grant P, Bell K, Stewart D, Paulson J, Rogers K. Evidence of methamphetamine exposure in children removed from clandestine methamphetamine laboratories. PEDIATRIC EMERGENCY CARE 2010;26(1):10-14.

Savopolos, JA, Person EC. Date rape drugs and children's toys. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(1):4.

Wells SM, Noonan C, Wells KM, Holian A, Wibbemmeyer LA. Effects of toxic gases: Methamphetamine inhalation. JOURNAL OF BURN CARE & RESEARCH 2009;30(1):152-154.

Witter RZ, Martyny JW, Mueller K, Gottschall B, Newman LS. Symptoms experienced by law enforcement personnel during methamphetamine lab investigations. JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL HYGIENE 2007;4:895-902.

Miscellaneous:

Frish MB, Wainner RT, Laderer MC, Green BD, Allen MG. Standoff and miniature chemical vapor detectors based on tunable diode laser absorption spectroscopy. IEEE SENSORS JOURNAL 2010;10(3):639-646.

Zipf EC. Emission detector for the remote detection of explosives and illegal drugs. (Patent) CHEMICAL ABSTRACTS 2007:874282.

---------- Next Section Moved Up to Reduce Deadspace ----------

IV) Reference Drug Standards and Total Syntheses

Issue:

Many reference drug standards or structurally related internal standards are either commercially unavailable, or if available are extremely expensive.

Solution:

Controlled substances and their structural or isotopically labelled analogs are synthesized as needed. Internal standards are also prepared as needed. Case reports are published for new or unusual standards or improved synthetic approaches.

References:

Rundlof T, Mathiasson M, Bekiroglu S, Hakkarainen B, Bowden T, Arvidsson T. Survey and qualification of internal standards for quantification by H-1 NMR spectroscopy. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2010;52(5):645-651.

Schwarz M, Klier B, Sievers H. Herbal reference standards. PLANTA MEDICA 2009;75(7):689-703.

Shaikh AC, Chen CP. Synthesis of deuterium-labeled Zaleplon-d(5) as an internal standard. JOURNAL OF LABELLED COMPOUNDS & RADIOPHARMA-CEUTICALS 2008;51(1-2):72-76.

Shaikh AC, Wang YY, Chen CP. Synthesis of deuterium-labelled standards of (+/-)-DOM and (+/-)-MMDA. JOURNAL OF LABELLED COMPOUNDS & RADIOPHARMACEUTICALS 2007;50(7-8):660-665.

Sharpless KE, Duewer DL. Standard reference materials for analysis of dietary supplements. JOURNAL OF AOAC INTERNATIONAL 2008;91(6):1298-1302.

Sharpless KE, Thomas JB, Christopher SJ, Greenberg RR, Sander LC, Schantz MM, Welch MJ, Wise SA. Standard reference materials for foods and dietary supplements. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2007;389:171-178.

Wang YY, Chen C. Synthesis of deuterium labeled tryptamine derivatives. JOURNAL OF THE CHINESE CHEMICAL SOCIETY 2007;54(5):1363-1368.

Wang YY, Chen CP. Synthesis of a deuterium-labelled standard of bufotenine (5-HO-DMT). JOURNAL OF LABELLED COMPOUNDS & RADIOPHARMACEUTICALS 2007;50(13-14):1262-1265.

You ZY, Chen YJ, Wang YY, Chen CP. Synthesis of deuterium labeled standards of 1-benzylpiperazine, fenetylline, nicocodeine and nicomorphine. JOURNAL OF THE CHINESE CHEMICAL SOCIETY 2008;55(3):663-667.

V) Source Determination of Drugs (Impurity Profiling) and Comparative Analyses

Issues:

Impurity profiling of drugs is important for comparative analysis protocols, geo-sourcing, and synthetic route determinations. However, although certain drugs have been well characterized with respect to their impurity profiles, most have not been properly investigated.

Comparative analysis (i.e., the systematic application of impurity profiling for determination of commonality of origin) is complicated due to both the high complexity of the data and the large numbers of exhibits. Improved analytical and data handling techniques are needed.

Solution:

High sensitivity analytical techniques (primarily chromatographic) provide detailed profiles of trace-level impurities, ions, trace metals, and stable isotopes. Identification of individual impurities enhance origin identification and comparative analyses and also aid in development of internal standards for improved accuracy and precision of analysis.

In-depth analysis via improved instrumental methodologies help identify discriminatory components in impurity profiles. Computer databases, sorting programs, and pattern recognition/neural networks provide enhanced data handling and analysis, enabling and improving comparative analyses. Case reports are generated for the forensic and enforcement communities.

References:

Amphetamine(s):

Kokiashvili NG, Wongwan S, Landgraf C, Michaelis K, Hammitzsch-Wiedemann M, Scriba GKE. Profiling of levoamphetamine and related substances in dexamphetamine sulfate by capillary electrophoresis. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;50(5):1050-1053.

Zhang J, Zhang D. Study on the optimization methods of common-batch identification of amphetamine samples. WEISHENG YANJIU 2008;37(4):505-507.

Cocaine:

Dujourdy L, Besacier F. Headspace profiling of cocaine samples for intelligence purposes. FORENSIC SCIENCE INTERNATIONAL 2008;179(2-3):111-122.

Galimov EM, Sevast'yanov VS, Kul'bachevskaya EV, Golyavin AA. The identification of the geographical origin of narcotic drugs based on the carbon and nitrogen isotope ratios. MASS-SPEKTROMETRIYA 2004;1(1):31.

Garzon WF, Parada F, Florian NM. Forensic analysis of cocaine samples produced in colombia: I. Chromatographic profiling. VITAE-REVISTA DE LA FACULTAD DE QUIMICA FARMACEUTICA 2009;16(2):228-236.

Garzon WF, Parada F, Florian NM. Forensic analysis of cocaine samples produced in Colombia: I. Chromatographic profiling. VITAE-REVISTA DE LA FACULTAD DE QUIMICA FARMACEUTICA 2009;16(2):220-227.

Lociciro S, Hayoz P, Esseiva P, Dujourdy L, Besacier F, Margot P. Cocaine profiling for strategic intelligence purposes, a cross-border project between France and Switzerland - Part I. Optimisation and harmonisation of the profiling method. FORENSIC SCIENCE INTERNATIONAL 2007;167(2-3):220-228.

Lociciro S, Esseiva P, Hayoz P, Dujourdy L, Besacier F, Margot P. Cocaine profiling for strategic intelligence, a cross-border project between France and Switzerland - Part II. Validation of the statistical methodology for the profiling of cocaine. FORENSIC SCIENCE INTERNATIONAL 2008;177(2-3):199-206.

Sewenig S, Fichtner S, Holdermann T, Fritschi G, Neumann H. Determination of delta C-13(V-PDB) and delta N-15(AIR) values of cocaine from a big seizure in Germany by stable isotope ratio mass spectrometry. ISOTOPES IN ENVIRONMENTAL AND HEALTH STUDIES 2007;43(4):275-280.

Heroin:

Cai XL, Wu GP. Preliminary study on identification of heroin from different routes with clustering analysis by Fourier transform infrared spectroscopy. SPECTROSCOPY AND SPECTRAL ANALYSIS 2007;27(12):2441-2444.

Dufey V, Dujourdy L, Besacier F, Chaudron H. A quick and automated method for profiling heroin samples for tactical intelligence purposes. FORENSIC SCIENCE INTERNATIONAL 2007;169(2-3):108-117.

Hibbert DB, Blackmore D, Li JF, Ebrahimi D, Collins M, Vujic S, Gavoyannis P. A probabilistic approach to heroin signatures. ANALYTICAL & BIOANALYTICAL

CHEMISTRY 2010;396(2):765-773.

Huai C, Chen G, Hong L, Fan L, Ping F, Zhao W, Yang H, Su S, Wen Y. A new method to differentiate heroin source and the use of software. JISUANJI YU YINGYONG HUAXUE 2008;25(11):1329-1333.

Lurie IS, Toske SG. Applicability of ultra-performance liquid chromatography-tandem mass spectrometry for heroin profiling. JOURNAL OF CHROMATOGRAPHY A 2008;1188(2):322-326.

Morello DR, Cooper SD, Panicker S, Casale JF. Signature profiling and classification of illicit heroin by GC-MS analysis of acidic and neutral manufacturing impurities. JOURNAL OF FORENSIC SCIENCES 2010;55(1):42-49.

Nguyen XT, Hoang MH, Do DN, Tran VS. Establishment of the method for analysis of solvent residue in heroin samples to track the origin. TAP CHI DUOC HOC 2007;47(2):34.

Odell LR, Skopec J, McCluskey A. Isolation and identification of unique marker compounds from the Tasmanian poppy Papaver somniferum N. Implications for the identification of illicit heroin of Tasmanian origin. FORENSIC SCIENCE INTERNATIONAL 2009;183(1-3):105-106.

Odell LR, Skopec J, McCluskey A. Isolation and identification of unique marker compounds from the Tasmanian poppy Papaver somniferum N. Implications for the identification of illicit heroin of Tasmanian origin. FORENSIC SCIENCE INTERNATIONAL 2008;175(2-3):202-208.

Qian Z, Zhang C, Zheng H. Determination on heroin geographical source by capillary electrophoresis and principal component analysis. HUAXUE FENXI JILIANG 2008;17(2):31-33.

Qian Z, Zhang C, Zheng H. Determination of heroin geographical source by capillary electrophoresis and discriminant analysis. HUAXUE FENXI JILIANG 2008;17(4):40-42.

Wang Y, Wen Y, Luo A, Zou H. Application of hierarchical clustering to the classification of spectra of pyrolytic cracking of heroin. LIHUA JIANYAN, HUAXUE FENCE 2008;44(3):205-208.

Wen Y, Zhang J. Testing of 15 elements in heroin produced in different areas by ICP-AES. LIHUA JIANYAN, HUAZUE FENCE 2008;44(10):980-985.

Xing H, Ma G, Zhang C, Bai Y. Application of chemometrics in heroin source determination. JISUANJI YU YINGYONG HUAXUE 2008;25(4):437-440.

Zhang C, Zheng H, Qian Z. Rapid test and source determination of heroin samples by GC/FID. HUAXUE FENXI JILIANG 2007;16(5):39-41.

Marijuana:

Ehleringer JR, West J, Hurley J. Geographical region of origin and cultivation assignments of marijuana seizures in major cities. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

ElSohly MA, Stanford DF, Murphy TP. Chemical fingerprinting of cannabis as a means of source identification. FORENSIC SCIENCE AND MEDICINE 2007;51-66.

Gilmore S, Peakall R, Robertson J. Organelle DNA haplotypes reflect crop-use characteristics and geographic origins of Cannabis sativa. FORENSIC SCIENCE INTERNATIONAL 2007;172(2-3):179.

Hurley JM, West JB, Ehleringer JR. Tracing retail cannabis in the United States: Geographic origin and cultivation patterns. INTERNATIONAL JOURNAL OF DRUG POLICY 2010;21(3):222-228.

Shibuya EK, Sarkis JES, Negrini-Neto O, Ometto JPHB. Multivariate classification based on chemical and stable isotopic profiles in sourcing the origin of marijuana samples seized in Brazil. JOURNAL OF THE BRAZILIAN CHEMICAL SOCIETY 2007;18(1):205-214.

West JB, Hurley JM, Ehleringer JR. Stable isotope ratios of marijuana. I. Carbon and nitrogen stable isotopes describe growth conditions. JOURNAL OF FORENSIC SCIENCES 2009;54(1):84-89.

West JB, Hurley JM, Dudas FO, Ehleringer JR. The stable isotope ratios of marijuana. II. Strontium isotopes relate to geographic origin. JOURNAL OF FORENSIC SCIENCES 2009;54(6):1261-1269.

Zacca JJ, Fava N, Santos RV, Mancini LH, Bastos MQ, Pacheco WL, Lima BA. Stable isotope ratios of marijuana from Brazil and Paraguay: Carbon and nitrogen as guides for growth conditions. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Methamphetamine:

Billault I, Courant F, Pasquereau L, Derrien S, Robins RJ, Naulet N. Correlation between the synthetic origin of methamphetamine samples and their N-15 and C-13 stable isotope ratios. ANALYTICA CHIMICA ACTA 2007;593(1):20-29.

Collins M, Cawley AT, Heagney AC, Kissane L, Robertson J, Salouros H. delta C-13, delta N-15 and delta H-2 isotope ratio mass spectrometry of ephedrine and pseudo-ephedrine: Application to methylamphetamine profiling. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(13):2003-2010.

Cox M, Klass G, Koo CWM. Manufacturing by-products from, and stereochemical outcomes of the biotransformation of benzaldehyde used in the synthesis of methamphetamine. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):60-67.

David GE, Hibbert DB, Frew RD, Hayman AR. Significant determinants of isotope composition during HI/P-red synthesis of methamphetamine. AUSTRALIAN JOURNAL OF CHEMISTRY 2010;63(1):22-29.

Dujourdy L, Dufey V, Besacier F, Miano N, Marquis R, Lock E, Aalberg L, Dieckmann S, Zrcek F, Bozenko JS. Drug intelligence based on organic impurities in illicit MA samples. FORENSIC SCIENCE INTERNATIONAL 2008;177(2-3):153-161.

Ikehara Y, Kurashima N, Makino Y, Nagano T, Sanuki K, Urano Y. Use of stable isotope ratios for profiling of industrial ephedrine samples: Application of hydrogen isotope ratios in combination with carbon and nitrogen. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):14-18.

Inoue H, Iwata YT, Kuwayama K. Characterization and profiling of methamphetamine seizures. JOURNAL OF HEALTH SCIENCE 2008;54(6):615-622.

Iwata YT, Kuwayama K, Tsujikawa K, Miyaguchi H, Kanamori T, Inoue H. Evaluation method for linking methamphetamine seizures using stable carbon and nitrogen isotopic compositions: A complementary study with impurity profiling. RAPID

COMMUNICATIONS IN MASS SPECTROMETRY 2008;22(23):3816-3822.

Ko BJ, Suh SI, Suh YJ, In MK, Kim SH. The impurity characteristics of methamphetamine synthesized by Emde and Nagai method. FORENSIC SCIENCE INTERNATIONAL 2007;170(2-3):142.

Kunalan V, Daeid NN, Kerr WJ, Buchanan HAS, McPherson AR. Characterization of route specific impurities found in methamphetamine synthesized by the Leuckart and reductive amination methods. ANALYTICAL CHEMISTRY 2009;81(17):7342-7348.

Kurashima N, Makino Y, Urano Y, Sanuki K, Ikehara Y, Nagano T. Use of stable isotope ratios for profiling of industrial ephedrine samples: Application of hydrogen isotope ratios in combination with carbon and nitrogen. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):14-18.

Kuwayama K, Inoue H, Kanamori T, Tsujikawa K, Miyaguchi H, Iwata Y, Kamo N, Kishi T. Contribution of thermal desorption and liquid-liquid extraction for identification and profiling of impurities in methamphetamine by gas chromatography-mass spectrometry. FORENSIC SCIENCE INTERNATIONAL 2007;171(1):9-15.

Kuwayama K, Inoue H, Phorachata J, Kongpatnitiroj K, Puthaviriyakorn V, Tsujikawa K, Miyaguchi H, Kanamori T, Iwata YT, Kamo N, Kishi T. Comparison and classification of methamphetamine seized in Japan and Thailand using gas chromatography with liquid-liquid extraction and solid-phase microextraction. FORENSIC SCIENCE INTERNATIONAL 2008;175(2-3):85-92.

Lee JS, Chung HS, Kuwayama K, Inoue H, Lee MY, Park JH. Determination of impurities in illicit methamphetamine seized in Korea and Japan. ANALYTICA CHIMICA ACTA 2008;619(1):20-25.

Lee JS, Yang WK, Han EY, Lee SY, Park YH, Lim MA, Chung HS, Park JH. Monitoring precursor chemicals of methamphetamine through enantiomer profiling. FORENSIC SCIENCE INTERNATIONAL 2007;173(1):68.

Li Q, Xu H, Song Z, Li Q. Analysis of organic impurity profiling of illicit methamphetamine bydrochloride crystal by GC-MS. FENXI CESHI XUEBAO 2007;26(3):310-314.

Matsumoto T, Urano Y, Makino Y, Kikura-Hanajiri R, Kawahara N, Goda Y, Nagano T.

Evaluation of characteristic deuterium distributions of ephedrines and methamphetamines by NMR spectroscopy for drug profiling. ANALYTICAL CHEMISTRY 2008;80(4):1176-1181.

Person EC, Golden ML. Current views on the molecular structures of phosphorus allotropes. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(4):20.

Person E, Heegel RA, Knops LA, Northrop DM. Phosphorus-containing reducing agents: A review of their chemistry and use in the manufacture of methamphetamine and the significance of observed phosphate, phosphite, and hypophosphite in clandestine laboratory casework. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(2):7-38.

Qi Y, Evans I, McCluskey A. New impurity profiles of recent Australian imported "Ice": Methamphetamine impurity profiling and the identification of (pseudo)ephedrine and Leuckart specific marker compounds. FORENSIC SCIENCE INTERNATIONAL 2007;169(2-3):173.

Salouros H, Collins M, George AV, Davies S. Isolation and identification of three by-products found in methylamphetamine synthesized by the Emde route. JOURNAL OF FORENSIC SCIENCES 2010;55(3):605-615.

Schneiders S, Holdermann T, Dahlenburg R. Comparative analysis of 1-phenyl-2-propanone (P2P), an amphetamine-type stimulant precursor, using stable isotope ratio mass spectrometry. Presented in part as a poster at the 2nd Meeting of the Joint European Stable Isotope User Meeting (JESIUM), Giens, France, September 2008. SCIENCE & JUSTICE 2009;49(2):94-101.

van Breukelen M, Hoitink M, Poortman A. Comparison of P2P seizures using GC/MS impurity profiling and IRMS. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Zhang J, Zhang D, Han X, Qiao J, Yang S, Xin G. Study on the linked samples of methamphetamine identified by the impurity profile. WEISHENG YANJIU 2008;37(6):736-739, 744.

Zhang J, Zhang D, Han X, Yang S, Xin G. Determination of the synthetic route based on impurity profiling of methamphetamine. WEISHENG YANJIU 2008;37(6):740-744.

Zhang J, Zhang D, Zhang W, Qiao J, Yang S, Xin G. Monitoring precursor chemicals through enantiomer profiling of methamphetamine. WEISHENG YANJIU 2009;38(4):426-428.

Zhang JX, Zhang DM, Han XG. Identification of impurities and statistical classification of methamphetamine hydrochloride drugs seized in China. FORENSIC SCIENCE INTERNATIONAL 2008;182(1-3):13-19.

3,4-Methylenedioxymethamphetamine:

Baer I, Gurny R, Margot P. NIR analysis of cellulose and lactose: Application to ecstasy tablet analysis. FORENSIC SCIENCE INTERNATIONAL 2007;167(2-3):234-241.

Bolck A, Weyermann C, Dujourdy L, Esseiva P, van den Berg J. Different likelihood ratio approaches to evaluate the strength of evidence of MDMA tablet comparisons. FORENSIC SCIENCE INTERNATIONAL 2009;191(1-3):42-51.

Bonadio F, Margot P, Delemont O, Esseiva P. Optimization of HS-SPME/GC-MS analysis and its use in the profiling of illicit ecstasy tablets (Part 1). FORENSIC SCIENCE INTERNATIONAL 2009;187(1-3):73-80.

Bonadio F, Margot P, Delemont O, Esseiva P. Headspace solid-phase microextraction (HS-SPME) and liquid-liquid extraction (LLE): Comparison of the performance in classification of ecstasy tablets (Part 2). FORENSIC SCIENCE INTERNATIONAL 2008;182(1-3):52-56.

Buchanan HAS, Daeid NN, Meier-Augenstein W, Kemp HF, Kerr WJ, Middleditch M. Emerging use of isotope ratio mass spectrometry as a tool for discrimination of 3,4-methylenedioxymethamphetamine by synthetic route. ANALYTICAL CHEMISTRY 2008;80(9):3350-3356.

Byrska B, Zuba D. Profiling of 3,4-methylenedioxymethamphetamine by means of high-performance liquid chromatography. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2008;390(2):715-722.

Cioroch K, Zuba D. Analytical approaches used for profiling of ecstasy tablets. Z ZAGADNIEN NAUK SADOWYCH 2007;69:71-89.

Cox M, Klass G, Morey S, Pigou P. Chemical markers from the peracid oxidation of

isosafrole. FORENSIC SCIENCE INTERNATIONAL 2008;179(1):44-53.

Fierro I, Deban L, Pardo R, Tascon M, Vazquez D. Analysis of heavy metals in ecstasy tablets by electrochemical methods. TOXICOLOGICAL AND ENVIRONMENTAL CHEMISTRY 2007;89(3):411.

Kochana J, Tomaszewski W, Moszczynski T, Zakrzewska A, Parczewski A. Application of carbon adsorbents for extraction of MDMA impurities in TLC drug profiling. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2008;31(6):819-827.

Koper C, van den Boom C, Wiarda W, Schrader M, de Joode P, van der Peijl G, Boick A. Elemental analysis of 3,4-methylenedioxymethamphetamine (MDMA): A tool to determine the synthesis method and trace links. FORENSIC SCIENCE INTERNATIONAL 2007;171(2-3):171-179.

Marquis R, Weyermann C, Delaporte C, Esseiva P, Aalberg L, Besacier F, Bozenko JS, Dahlenburg R, Kopper C, Zrcek F. Drug intelligence based on MDMA tablets data 2. Physical characteristics profiling. FORENSIC SCIENCE INTERNATIONAL 2008;178(1):34-39.

Meisinger SC, Waddell-Smith R. Comparison of extraction procedures for organic impurity profiling of seized MDMA tablets. 2008 American Academy of Forensic Sciences Annual Meeting.

Meng PJ, Margot P. Constituent profiling of ecstasy seizures by GC-MS after joint derivatization with MSTFA and MBTFA. FORENSIC TOXICOLOGY 2010;28(1):52-54.

Milliet Q, Weyermann C, Esseiva P. The profiling of MDMA tablets: A study of the combination of physical characteristics and organic impurities as sources of information. FORENSIC SCIENCE INTERNATIONAL 2009;187(1-3):58-65.

Waddell-Smith RJH. A review of recent advances in impurity profiling of illicit MDMA samples. JOURNAL OF FORENSIC SCIENCES 2007;52(6):1297-1304.

Weyermann C, Marquis R, Delaporte C, Esseiva P, Lock E, Aalberg L, Bozenko JS, Dieckmann S, Dujourdy L, Zrcek F. Drug intelligence based on MDMA tablets data - I. Organic impurities profiling. FORENSIC SCIENCE INTERNATIONAL

2008;177(1):11-16.

Multi-Drug and Miscellaneous:

Gross KC. Passive tagging of pharmaceutical products with noble gas isotopes. (Patent) CHEMICAL ABSTRACTS 2007;147:39338v.

Jasper JP, Weaner LE, Hayes JM. Process patent protection: Characterizing synthetic pathways by stable-isotopic measurements. PHARMACEUTICAL TECHNOLOGY 2007;31(3):68-78.

Lock CM, Meier-Augenstein W. Investigation of isotopic linkage between precursor and product in the synthesis of a high explosive. FORENSIC SCIENCE INTERNATIONAL 2008;179(2-3):157-162.

Marclay F, Pazos D, Delemont O, Esseiva P, Saudan C. Potential of IRMS technology for tracing gamma-butyrolactone (GBL). FORENSIC SCIENCE INTERNATIONAL 2010;198(1-3):46-52.

Wise SH, Almirall JR. Chemical taggant detection and analysis by laser-induced breakdown spectroscopy. APPLIED OPTICS 2008;47(31):G15-G20.

Yip YC, Lam JCW, Tong WF. Applications of lead isotope ratio measurements. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2008;27(5):460-480.

Zhang G, Jin Y. Recent advances on the techniques of fluorescent-labeling and its application. WUJING YIZUEYUAN ZUEBAO 2008;17(6):550-552.

Zhu EY, Lin Y, Zhuang ZY. Partial least squares variable selection method and its application in drug source analysis. CHINESE JOURNAL OF ANALYTICAL CHEMISTRY 2007;35:973-977.

VI) Analysis of Non-Controlled Pharmaceuticals, Pseudo-Drugs, Adulterants, Diluents, and Precursors

Issue:

Most "street-level" drugs are "cut" with various adulterants and diluents. Many of these cutting agents are pharmaceutical products or precursors. Others are "carry-through" compounds present in precursors (especially in cold remedy products). Separation and identification of these extraneous materials can be tedious, especially in exhibits which contain many components. In addition, new or unusual adulterants and/or diluents are occasionally identified in drug exhibits, and standard analytical data are required for these substances. Finally, improved methods of analysis, i.e., faster, more discriminatory, less costly, etc., are needed for all cutting agents.

Solution:

Reports providing standard analytical data and/or improved analytical protocols for non-controlled pharmaceuticals, pseudo-drugs, adulterants, diluents, and precursors are generated for the forensic and enforcement communities.

References:

Ephedra, Ephedrine, and/or Pseudoephedrine and Related Compounds:

Ansell RJ, Wang DY, Kuah JKL. Imprinted polymers for chiral resolution of (+/-)-ephedrine. Part 2: Probing pre-polymerisation equilibria in different solvents by NMR. ANALYST 2008;133(12):1673-1683.

Ansell RJ, Wang DY. Imprinted polymers for chiral resolution of (+/-)-ephedrine. Part 3: NMR predictions and HPLC results with alternative functional monomers. ANALYST 2009;134(3):564-576.

bin Abdullah AFL, Miskelly GM. Formation of trifluoroacetylated ephedrine during the analysis of a pseudoephedrine-formaldehyde adduct by TFAA derivatization followed by GC-MS. JOURNAL OF FORENSIC SCIENCES 2009;54(2):365-369.

Boff BD, Sebben VC, Paliosa PK, Azambuja I, Singer RB, Limberger RP. Investigation of the presence of ephedrines in Ephedra tweediana Fisch & CA Meyer and E. triandra Tul. (Ephedraceae) collected in Porto Alegre/RS. REVISTA BRASILEIRA DE FARMACOGNOSIA-BRAZILIAN JOURNAL OF PHARMACOGNOSY 2008;18(3):394-401.

Fan Q, Wang YL, Sun P, Liu S, Li Y. Discrimination of Ephedra plants with diffuse reflectance FT-NIRS and multivariate analysis. TALANTA 2010;80(3):1245-1250.

Ghafoor S, Shah MM, Ahmad H, Swati ZA, Shah SH, Pervez A, Farooq U. Molecular characterization of Ephedra species found in Pakistan. GENETICS AND MOLECULAR RESEARCH 2007;6(4):1123-1130.

Guerreiro AR, Korkhov V, Mijangos I, Piletska EV, Rodins J, Turner APF, Piletsky SA. Influence of continuous magnetic field on the separation of ephedrine enantiomers by molecularly imprinted polymers. BIOSENSORS & BIOELECTRONICS 2008;23(7):1189-1194.

Hakey PM, Allis DG, Hudson MR, Ouellette W, Korter TM. Investigation of (1R,2S)-(-)-ephedrine by cryogenic terahertz spectroscopy and solid-state density functional theory. CHEMPHYSCHEM 2009;10(14):2434-2444.

Hayashi K, Shimura K, Makino T, Mizukami H. Comparison of the contents of kampo decoctions containing ephedra herb when prepared simply or by re-boiling according to the traditional theory. JOURNAL OF NATURAL MEDICINES 2010;64(1):70-74.

Inoko A, Kakiuchi N, Yoshimitsu M, Cai SQ, Mikage M. Ephedra resource in Sichuan and Yunnan provinces 2007. BIOLOGICAL & PHARMACEUTICAL BULLETIN 2009;32(9):1621-1623.

Kakiuchi N, Inoue K, Kurita Y, Ohkubo K, Tsuda Y, Mikage M. Survey of Ephedra resources in the northern areas of Pakistan and their genetic diversity. JOURNAL OF NATURAL MEDICINES 2007;61(3):357-365.

Kitani Y, Zhu S, Omote T, Tanaka K, Batkhuu J, Sanchir C, Fushimi H, Mikage M, Komatsu K. Molecular analysis and chemical evaluation of ephedra plants in Mongolia. BIOLOGICAL & PHARMACEUTICAL BULLETIN 2009;32(7):1235-1243.

Lu J, Jin X, Mao PH, Ma XD, Ling HQ, Fan YH, Yu L, Wu BS, Ouyang PK. Transfer of ephedra genomic DNA to yeasts by ion implantation. APPLIED BIOCHEMISTRY AND BIOTECHNOLOGY 2009;158(3):571-581.

Mao P, Ma X, Jin X, Yang H, Lou K. Production of l-ephedrine and d-pseudoephedrine in recombined yeasts obtained by Argon ion implantation mediated Ephedra genome DNA transformation. WEISHENGWU XUEBAO 2007;47(5):905-909.

Okada T, Nakamura Y, Kanaya S, Takano A, Malla KJ, Nakane T, Kitayama M, Sekita S. Metabolome analysis of ephedra plants with different contents of ephedrine alkaloids by using UPLC-Q-TOF-MS. PLANTA MEDICA 2009;75(12):1356-1362.

Pellati F, Benvenuti S. Determination of ephedrine alkaloids in Ephedra natural products using HPLC on a pentafluorophenylpropyl stationary phase. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;48(2):254-263.

Ranieri TL, Ciolino LA. Rapid selective screening and determination of ephedrine alkaloids using GC-MS footnote mark. PHYTOCHEMICAL ANALYSIS 2008;19(2):127-135.

Valente AJM, Ribeiro ACF, Marques JMC, Abreu PE, Lobo VMM, Kataky R. Transport properties of aqueous solutions of (1R,2S)-(-)- and (1S,2R)-(+)-ephedrine hydrochloride at different temperatures. JOURNAL OF CHEMICAL AND ENGINEERING DATA 2010;55(3):1145-1152.

Wang LL, Kakiuchi N, Mikage M. Studies of Ephedra plants in Asia. Part 6: Geographical changes of anatomical features and alkaloids content of Ephedra sinica. JOURNAL OF NATURAL MEDICINES 2010;64(1):63-69.

Wang LS, Zhao DQ, Liu YH. GC-MS analysis of the supercritical CO2 fluid extraction of Ephedra sinica roots and its antisudorific activity. CHEMISTRY OF NATURAL COMPOUNDS 2009;45(3):434-436.

Wilhalm T. Current survey of Ephedra stands (Ephedra helvetica, Ephedraceae, Gnetales) in South Tyrol. GREDLERIANA 2007;7:69-90.

Zhao W, Deng AJ, Du GH, Zhang JL, Li ZH, Qin HL. Chemical constituents of the stems of Ephedra sinica. JOURNAL OF ASIAN NATURAL PRODUCTS RESEARCH 2009;11(2):168-171.

Zhou L, Zhou XM, Luo Z, Wang WP, Yan N, Hu ZD. In-capillary derivatization and analysis of ephedrine and pseudoephedrine by micellar electrokinetic chromatography with laser-induced fluorescence detection. JOURNAL OF CHROMATOGRAPHY A 2008;1190(1-2):383-389.

Phenylpropanolamine:

Abbasi K, Bhanger MI, Khuhawar MY. Capillary-gas chromatographic determination of phenylpropanolamine using acetylacetone as derivatizing reagent in pharmaceutical preparations. JOURNAL OF THE CHEMICAL SOCIETY OF PAKISTAN 2008;30(5):692-695.

Hadad GM, El-Gindy A, Mahmoud WMM. Development and validation of chemometrics-assisted spectrophotometry and liquid chromatography methods for the simultaneous determination of the active ingredients in two multicomponent mixtures containing chlorpheniramine maleate and phenylpropanolamine hydrochloride. JOURNAL OF AOAC INTERNATIONAL 2007;90(4):957-970.

Other Adulterants/Diluents (including mixtures containing Ephedrine and/or Pseudoephedrine):

Amer SM, Abbas SS, Shehata MA, Ali NM. Simultaneous determination of phenylephrine hydrochloride, guaifenesin, and chlorpheniramine maleate in cough syrup by gradient liquid chromatography. JOURNAL OF AOAC INTERNATIONAL 2008;91(2):276-284.

Amin AS, Dessouki HA, Moustafa MM, Ghoname MS. Spectrophotometric methods for sertraline hydrochloride and/or clidinium bromide determination in bulk and pharmaceutical preparations. CHEMICAL PAPERS 2009;63(6):716-722.

Brettell TA. Chiral analysis of methorphan and citalopram using HPLC. 2008 American Academy of Forensic Sciences Annual Meeting.

El-Naby, EH. Polymeric membrance sensors for the selective determination of dextromethorphan in pharmaceutical preparations. ANALYTICAL SCIENCES 2008;24(11):1409-1414.

Liao CZ, Nicklaus MC. Comparison of nine programs predicting pK(a) values of pharmaceutical substances. JOURNAL OF CHEMICAL INFORMATION AND MODELING 2009;49(12):2801-2812.

Lin MC, Liu YC, Lin YL, Lin JH. Identification of a tadalafil analogue adulterated in a dietary supplement. JOURNAL OF FOOD AND DRUG ANALYSIS 2009;17(6):451-458.

Liu Y, Ge H, Zhao K, Yu L. Determination of three chemical components added illegally

in a analgesia traditional Chinese medicine preparation by TLC-MS. ZHONGGUO YAOXUE ZAZHI 2008;43(22):1747-1750.

McGehee MC. Etodolac: An analytical profile. MICROGRAM JOURNAL 2008;6(3-4):104.

Pavlic M, Schubert B, Libiseller K, Oberacher H. Comprehensive identification of active compounds in tablets by flow-injection data-dependent tandem mass spectrometry combined with library search. FORENSIC SCIENCE INTERNATIONAL 2010;197(1-3):40-47.

Rodriguez N, Vidot JV, Panelli J, Colon H, Ritchie B, Yamamura Y. GC-MS confirmation of xylazine (Rompun), a veterinary sedative, in exchanged needles. DRUG AND ALCOHOL DEPENDENCE 2008;96(3):290-293.

Theophylline:

Zare-Shahabadi V, Shamsipur M, Hemmatenejad B, Akhond M. Simultaneous determination of guaifenesin and theophylline by chemometrics methods. ANALYTICAL LETTERS 2010;43(4):687-700.

Miscellaneous:

Gratz SR, Zeller M, Mincey DW, Flurer CL. Structural characterization of sulfoaildenafil, an analog of sildenafil. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;50(2):228-231.

Jouyban A, Soltanpour S, Tamizi E. Solubility prediction of solutes in aqueous mixtures of ethylene glycols. PHARMAZIE 2008;63(7):548-550.

Kamb V. Analytical profile of lisdexamfetamine dimesylate (Vyvanse). JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;18(2):3.

Sakar MK, Alper-Yegul N. Isolation and identification of N-mono-desmethylsibutramine in a slimming herbal product. ACTA PHARMACEUTICA SCIENCIA 2008;50(2):97-100.

VII) New and/or Improved Instrumental Techniques

Issue:

Forensic Chemists must maintain familiarity with updates in current instrumental techniques and become versant in new, improved methods of analysis.

Solution:

Improved/existing and new technologies are reviewed and applied to both routine and specialized analyses of drugs. In cases where improved performance is observed, case reports are generated for the forensic community.

References:

Capillary Electrophoresis (and Related Techniques, including Tandem Techniques):

Assuncao NA, Bechara EJH, Simionato AVC, Tavares MFM, Carrilho E. Capillary electrophoresis coupled to mass spectrometry (CE-MS): Twenty years of development. QUIMICA NOVA 2008;31(8):2124-2133.

Aturki Z, D'Orazio G, Fanali S, Rocco A, Bortolotti F, Gottardo R, Tagliaro F. Capillary electrochromatographic separation of illicit drugs employing a cyano stationary phase. JOURNAL OF CHROMATOGRAPHY A 2009;1216(17):3652-3659.

Breadmore MC, Thabano JRE, Dawod M, Kazarian AA, Quirino JP, Guijt RM. Recent advances in enhancing the sensitivity of electrophoresis and electrochromatography in capillaries and microchips (2006-2008). ELECTROPHORESIS 2009;30(1):230-248.

Du Y, Wang E. Separation and detection of narcotic drugs on a microchip using micellar electrokinetic chromatography and electrochemiluminescence. ELECTROANALYSIS 2008;20(6):643-647.

Ganzera M. Quality control of herbal medicines by capillary electrophoresis: Potential, requirements and applications. ELECTROPHORESIS 2008;29(17):3489-3503.

Greenspoon SA, Yeung SHI, Johnson KR, Chu WK, Rhee HN, McGuckian AB, Crouse CA, Chiesl TN, Barron AE, Scherer JR, Ban JD, Mathies RA. A forensic laboratory tests the Berkeley microfabricated capillary array electrophoresis device. JOURNAL OF FORENSIC SCIENCES 2008;53(4):828-837.

Gubitz G, Schmid MG. Chiral separation by capillary electromigration techniques. JOURNAL OF CHROMATOGRAPHY A 2008;1204(2):140-156.

Hoeman KW, Culbertson CT. A novel, environmentally friendly sodium lauryl ether sulfate-, cocamidopropyl betaine-, cocamide monoethanolamine-containing buffer for MEKC on microfluidic devices. ELECTROPHORESIS 2008;29(24):4900-4905.

Huck CW, Huck-Pezzei V, Bakry R, Bachmann S, Najam-ul-Haq M, Rainer M, Bonn GK. Capillary electrophoresis coupled to mass spectrometry for forensic analysis. OPEN CHEMICAL ENGINEERING JOURNAL 2007;1:30-43.

Huhn C, Puetz M, Holthausen I, Pyell U. Separation of very hydrophobic analytes by micellar electrokinetic chromatography. I. Optimization of the composition of the sample solution for the determination of the aromatic ingredients of sassafras and other essential oils of forensic interest. ELECTROPHORESIS 2008;29(2):526-537.

Jiang ZJ, Thorogate R, Smith NW. Highlighting the role of the hydroxyl position on the alkyl spacer of hydroxypropyl-beta-cyclodextrin for enantioseparation in capillary electrophoresis. JOURNAL OF SEPARATION SCIENCE 2008;31(1):177-187.

Jouyban A, Kenndler E. Impurity analysis of pharmaceuticals using capillary electromigration methods. ELECTROPHORESIS 2008;29(17):3531-3551.

Li MJ, Zhou JY, Gu X, Wang Y, Huang XJ, Yan C. Quantitative capillary electrophoresis and its application in analysis of alkaloids in tea, coffee, coca cola, and theophylline tablets. JOURNAL OF SEPARATION SCIENCE 2009;32(2):267-274.

Loden H, Pettersson C, Arvidsson T, Amini A. Quantitative determination of salbutamol in tablets by multiple-injection capillary zone electrophoresis. JOURNAL OF CHROMATOGRAPHY A 2008;1207(1-2):181-185.

Magana JJ, de la Luz Arenas-Sordo M, Gomez R. Capillary electrophoresis, a new diagnostic tool. REVISTA MEDICA DE CHILE 2009;137(7):946-956.

Mala Z, Slampova A, Gebauer P, Bocek P. Contemporary sample stacking in CE. ELECTROPHORESIS 2009;30(1):215-229.

Preinerstorfer B, Lammerhofer M, Lindner W. Advances in enantioselective separations using electromigration capillary techniques. ELECTROPHORESIS 2009;30(1):100-132.

Rohrbasser C, Rheme D, Decastel S, Roth S, Aja Montes M, Veuthey J, Rudaz S. A new capillary electrophoresis device with deep UV detector based on LED technology. CHIMIA 2009;63(12):890-891.

Saavedra L, Nickerson B, Borjas RE, Lynen F, Sandra P. Enantioseparation of pharmaceutical compounds by multiplexed capillary electrophoresis using highly sulphated alpha-, beta- and gamma-cyclodextrins. JOURNAL OF CHROMATOGRAPHY B-ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES 2008;875(1):248-253.

Scriba GKE. Cyclodextrins in capillary electrophoresis enantioseparations - Recent developments and applications. JOURNAL OF SEPARATION SCIENCE 2008;31(11):1991-2011.

Staub A, Giraud S, Saugy M, Rudaz S, Veuthey J, Schappler J. CE-ESI-TOF/MS for human growth hormone analysis. ELECTROPHORESIS 2010;31(2):388-395.

Tagliaro F, Bortolotti F. Recent advances in the applications of CE to forensic sciences (2005-2007). ELECTROPHORESIS 2008;29(1):260-268.

Tagliaro F, Pascali J, Fanigliulo A, Bortolotti F. Recent advances in the application of CE to forensic sciences: An update over years 2007-2009. ELECTROPHORESIS 2010;31(1):251-259.

Yang YL, Zhu CF, Shen J, Hao AY. Enantioseparation in capillary electrophoresis using 6-oligo(lactic acid)cyclomaltoheptaose as a chiral selector. ANALYTICAL SCIENCES 2009;25(11):1315-1318.

Yin DG, Wu MH, Xie CJ, Zhang L, Liu BH, Zhou XZ, Wang P. A novel capillary electrophoresis - chemiluminescence system for separation and detection of amino acids. CHINESE JOURNAL OF ANALYTICAL CHEMISTRY 2009;37(1):152-156.

Zhu FX, Du YX, Chen JQ, Chen B, Zhu YQ, Zhai X, Xu S, Zhou WH. Enantioselective separation of basic drugs by CE with polygalacturonic acid as a novel chiral selector. CHROMATOGRAPHIA 2009;69(11-12):1315-1320.

Extraction Techniques:

Almirall J, Perr J, Guerra P. Method and apparatus for extraction, detection, and

characterization of vapors from explosives, taggants in explosives, controlled substances, and biohazards. APPLICATION: US 2008-135954;9 June 2008.

Brewer W. Pipette tips for extraction, sample collection and sample cleanup, and methods for their use. PCT Int. Appl. WO 2008 103,828.

Gonzalez-Marino I, Quintana JB, Rodriguez I, Cela R. Determination of drugs of abuse in water by solid-phase extraction, derivatisation and gas chromatography-ion trap-tandem mass spectrometry. JOURNAL OF CHROMATOGRAPHY A 2010;1217(11):1748-1760.

Juhascik MP, Jenkins AJ. Comparison of liquid/liquid and solid-phase extraction for alkaline drugs. JOURNAL OF CHROMATOGRAPHIC SCIENCE 2009;47(7):553-557.

Kmecz I, Simandi B, Szekely E, Lovasz J, Fogassy E. Application of mixtures of tartaric acid derivatives in resolution via supercritical fluid extraction. CHIRALITY 2007;19(6):430-433.

Lu J, Shen D, Liu Y. Solubilization of microemulsion to indissolvable drugs and its clinical application. WUJING YIXUEYUAN XUEBAO 2008;17(3):241-243.

Madej K. Microwave-assisted and cloud-point extraction in determination of drugs and other bioactive compounds. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2009;28(4):436-446.

Person EC, Sunderson NS. Liquid-liquid extractions of phenylephrine. JOURNAL OF THE CLANDESTINE LABORATORY INVESTIGATING CHEMISTS ASSOCIATION 2008;19(1):4.

Wietecha-Posluszny R, Wozniakiewicz M, Garbacik A, Koscielniak P. Application of microwave-assisted extraction in isolation of psychotropic drugs from biological material. Z ZAGADNIEN NAUK SADOWYCH 2007;70:187-197.

Wille SMR, Lambert WEE. Recent developments in extraction procedures relevant to analytical toxicology. ANALYTICAL AND BIOANALYTICAL CHEMISTRY 2007;388(7):1381-1391.

Xu L, Basheer C, Lee HK. Chemical reactions in liquid-phase microextraction. JOURNAL OF CHROMATOGRAPHY A 2009;1216(4):701-707.

Gas Chromatography (and Tandem GC Techniques):

Ali S, Ashraf-Khorassani M, Taylor LT, Agah M. MEMS-based semi-packed gas chromatography columns. SENSORS AND ACTUATORS B: CHEMICAL 2009;141(1):309-315.

Binkley J. Rapid analysis of drugs by abuse by gas chromatography-time of flight mass spectrometry. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

Chu FL, Yaylayan VA. Model studies on the oxygen-induced formation of benzaldehyde from phenylacetaldehyde using pyrolysis GC-MS and FTIR. JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 2008;56(22):10697-10704.

Damm M, Rechberger G, Kollroser M, Kappe CO. An evaluation of microwave-assisted derivatization procedures using hyphenated mass spectrometric techniques. JOURNAL OF CHROMATOGRAPHY A 2009;1216(31):5875-5881.

Fan WZ, Zhang Y, Carr PW, Rutan SC, Dumarey M, Schellinger AP, Pritts W. Application of Snyder-Dolan classification scheme to the selection of "orthogonal" columns for fast screening of illicit drugs and impurity profiling of pharmaceuticals - I. Isocratic elution. JOURNAL OF CHROMATOGRAPHY A 2009;1216(38):6587-6599.

Fialkov AB, Gordin A, Amirav A. Hydrocarbons and fuels analyses with the supersonic gas chromatography mass spectrometry - The novel concept of isomer abundance analysis. JOURNAL OF CHROMATOGRAPHY A 2008;1195(1-2):127-135.

Grigor'ev AM, Savchuk SA. Correlation of the parameters of screening libraries of the gas-chromatographic retention data. JOURNAL OF ANALYTICAL CHEMISTRY 2010;65(4):388-397.

Groger T, Schaffer M, Putz M, Ahrens B, Drew K, Eschner M, Zimmermann R. Application of two-dimensional gas chromatography combined with pixel-based chemometric processing for the chemical profiling of illicit drug samples. JOURNAL OF CHROMATOGRAPHY A 2008;1200(1):8-16.

Hadef Y, Kaloustian J, Nicolay A, Portugal H. Thermal stability evaluation of doping compounds before GC-MS analysis by DSC. JOURNAL OF THERMAL ANALYSIS AND CALORIMETRY 2008;93(2):553-560.

Hoggard JC, Wahl JH, Synovec RE, Mong GM, Fraga CG. Impurity profiling of a chemical weapon precursor for possible forensic signatures by comprehensive two-dimensional gas chromatography/mass spectrometry and chemometrics. ANALYTICAL CHEMISTRY 2010;82(2):689-698.

Kirkpatrick DS. A practical guide to drug identification using fast GC/MS. 2008 American Academy of Forensic Sciences Annual Meeting.

Kudo K, Ishida T, Hikiji W, Hayashida M, Uekusa K, Usumoto Y, Tsuji A, Ikeda N. Construction of calibration-locking databases for rapid and reliable drug screening by gas chromatography-mass spectrometry. FORENSIC TOXICOLOGY 2009;27(1):21-31.

Kudo K, Ishida T, Ikeda N. Development of a systematic screening procedure for abused drugs without using standard compounds by gas chromatography/mass spectrometry. JOURNAL OF THE MASS SPECTROMETRY SOCIETY OF JAPAN 2008;56(3):123-30.

Lin DL, Wang SM, Wu CH, Chen BG, Liu RH. Chemical derivatization for the analysis of drugs by GC-MS. YAOWU SHIPIN FENXI 2008;16(1):1-10.

Maurer HH. Forensic screening with GC-MS. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:425-445.

Meier-Augenstein W, NicDaeid N. Feasibility of source identification of seized street drugs samples by exploiting differences in isotopic composition at natural abundance level by GC/MS as compared to isotope ratio mass spectrometry (IRMS). FORENSIC SCIENCE INTERNATIONAL 2008;174(2-3):259-261.

Mitrevski BS, Wilairat P, Marriott PJ. Comprehensive two-dimensional gas chromatography improves separation and identification of anabolic agents in doping control. JOURNAL OF CHROMATOGRAPHY A 2010;1217(1):127-135.

Ojanpera I, Rasanen I. Forensic screening by gas chromatography. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:403-424.

Schmarr HG, Bernhardt J. Profiling analysis of volatile compounds from fruits using comprehensive two-dimensional gas chromatography and image processing techniques. JOURNAL OF CHROMATOGRAPHY A 2010;1217(4):565-574.

Zeigler C, MacNamara K, Wang ZD, Robbat A. Total alkylated polycyclic aromatic hydrocarbon characterization and quantitative comparison of selected ion monitoring versus full scan gas chromatography/mass spectrometry based on spectral deconvolution. JOURNAL OF CHROMATOGRAPHY A 2008;1205(1-2):109-116.

Zhang Y. Optimization of determination method for components and impurities of illicit drugs by GC-MS. ZHONGGUO YAOWU LANYONG FANGZHI ZAZHI 2007;13(1):19-21.

High-Performance Liquid Chromatography (and tandem HPLC techniques):

Dragovic S, Haghedooren E, Nemeth T, Palabiyik IM, Hoogmartens J, Adams E. Evaluation of two approaches to characterise liquid chromatographic columns using pharmaceutical separations. JOURNAL OF CHROMATOGRAPHY A 2009;1216(15):3210-3216.

Dresen S, Gergov M, Politi L, Halter C, Weinmann W. ESI-MS/MS library of 1,253 compounds for application in forensic and clinical toxicology. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;395(8):2521-2526.

Fountain KJ, Xu J, Diehl DM, Morrison D. Influence of stationary phase chemistry and mobile-phase composition on retention, selectivity, and MS response in hydrophilic interaction chromatography. JOURNAL OF SEPARATION SCIENCE 2010;33(6-7):740-751.

Gergov M. Forensic screening with liquid chromatography-mass spectrometry. HANDBOOK OF ANALYTICAL SEPARATIONS 2008;6:491-511.

Gholami M, Ghassempour A, Alizadeh R, Aboul-Enein HY. Microcolumn LC enantioseparation of chiral compounds using diol silica gel functionalized with vancomycin crystalline degradation products. JOURNAL OF SEPARATION SCIENCE 2009;32(7):918-922.

Huerta-Fontela M, Galceran MT, Ventura F. Ultraperformance liquid chromatography - tandem mass spectrometry analysis of stimulatory drugs of abuse in wastewater and surface waters. ANALYTICAL CHEMISTRY 2007;79(10):3821-3829.

Huttunen J, Dawson M, Roux C, Robertson J. Physical evidence in drug intelligence Part 3: Supercritical fluid extraction-high performance liquid chromatography of packaging

tapes. AUSTRALIAN JOURNAL OF FORENSIC SCIENCES 2009;41(1):63-72.

Krawczeniuk AS. LC/MS Electrospray applications and the use of in-source collision induced dissociation (CID) in the confirmatory analysis of drugs of abuse. 2008 American Academy of Forensic Sciences Annual Meeting.

Lee H, Shen S, Grinberg N. Identification and control of impurities for drug substance development using LC/MS and GC/MS. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2008;31(15):2235-2252.

Luo H, Ma LJ, Paek C, Carr PW. Application of silica-based hyper-crosslinked sulfonate-modified reversed stationary phases for separating highly hydrophilic basic compounds. JOURNAL OF CHROMATOGRAPHY A 2008;1202(1):8-18.

Lurie I, Li L. Use of high-temperature liquid chromatography with sub-2μm particle C18 columns for the analysis of seized drugs. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2009;32(18):2615-2626.

Maldaner L, Jardim ICSF. A new thermally immobilized fluorinated stationary phase for RP-HPLC. JOURNAL OF SEPARATION SCIENCE 2010;33(2):174-181.

Min JZ, Hatanaka S, Toyo'oka T, Inagaki S, Kikura-Hanajiri R, Goda Y. Rapid sensitive and simultaneous determination of fluorescence-labeled designated substances controlled by the Pharmaceutical Affairs Law in Japan by ultra-performance liquid chromatography coupled with electrospray-ionization time-of-flight mass spectrometry. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;395(5):1411-1422.

Nakashima K, Ikeda R, Wada M. Analytical studies on the development of high-performance liquid chromatographic methods with fluorescence or chemiluminescence detections and their practical applications. ANALYTICAL SCIENCES 2009;25(1):21-31.

Nguyen DT, Guillarme D, Heinisch S, Barrioulet MP, Rocca JL, Rudaz S, Veuthey JL. High throughput liquid chromatography with sub-2μm particles at high pressure and high temperature. JOURNAL OF CHROMATOGRAPHY A 2007;1167(1):76.

Ojanpera, I, Pelander A, Ojanpera S. Comprehensive toxicological and forensic drug screening by LC/TOF-MS. CHEMICAL ANALYSIS 2009;173:173-195.

Ortiz RS, Antunes MV, Linden R. Determination of sildenafil citrate and tadalafil by ultra performance liquid chromatography with diode-array detection (UPLC-DAD). QUIMICA NOVA 2010;33(2):389-393.

Postigo C, de Alda MJL, Viana M, Querol X, Alastuey A, Artinano B, Barcelo D. Determination of drugs of abuse in airborne particles by pressurized liquid extraction and liquid chromatography-electrospray-tandem mass spectrometry. ANALYTICAL CHEMISTRY 2009;81(11):4382-4388.

Ranc V, Havlicek V, Bednar P, Lemr K. Nanoelectrospray versus electrospray in chiral analysis by the kinetic method. COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS 2009;74(2):313-322.

Rodriquez-Cruz SE. Forensic applications of liquid chromatography mass spectrometry (LC-MS). 2008 American Academy of Forensic Sciences Annual Meeting.

Rosal C, Betowski D, Romano J, Neukom J, Wesolowski D, Zintek L. The development and inter-laboratory verification of LC-MS libraries for organic chemicals of environmental concern. TALANTA 2009;79(3):810-817.

Sauvage FL, Gaulier JM, Lachatre G, Marquet P. Pitfalls and prevention strategies for liquid chromatography-tandem mass spectrometry in the selected reaction-monitoring mode for drug analysis. CLINICAL CHEMISTRY 2008;54(9):1519-1527.

van Nuijs ALN, Tarcomnicu I, Bervoets L, Blust R, Jorens PG, Neels H, Covaci A. Analysis of drugs of abuse in wastewater by hydrophilic interaction liquid chromatography-tandem mass spectrometry. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;395(3):819-828.

Wang Y, Ong TT, Li LS, Tan TTY, Ng SC. Enantioseparation of a novel chemistry derived native beta-cyclodextrin chiral stationary phase for high-performance liquid chromatography. JOURNAL OF CHROMATOGRAPHY A 2009;1216(12):2388-2393.

Xiang P, Shen M, Zhuo X. Matrix effects in liquid chromatographic-mass spectrometric analysis. FENXI CESHI XUEBAO 2009;28(6):753-756.

Zhang Y, Liang C, Ye H, Wang G, Wang R, Ni C, Liu Y, Zhang R. Method for simultaneously and qualitatively screening 242 kinds of compounds by liquid chromatography-tandem mass spectrometry (LC-MS/MS). APPLICATION: CN

2010-201228;15 October 2008.

Zhen X, Bo Q, Lin GX, Lai CF, Hai L. Desorption electrospray ionization. PROGRESS IN CHEMISTRY 2008;20(4):594-601.

Inductively Coupled Plasma- Mass Spectrometry (ICP-MS, Also ICP-OES):

Ammann AA. Inductively coupled plasma mass spectrometry (ICP MS): A versatile tool. JOURNAL OF MASS SPECTROMETRY 2007;42(4):419-427.

Ash RD, McDonough WF. In situ laser ablation ICP MS trace element and isotope fingerprinting of powdered pharmaceuticals. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Campbell GP, Curran JM, Miskelly GM, Coulson S, Yaxley GM, Grunsky EC, Cox SC. Compositional data analysis for elemental data in forensic science. FORENSIC SCIENCE INTERNATIONAL 2009;188(1-3):81-90.

Noguchi O, Oshima M, Motomizu S. Minimization of sample volume with air-segmented sample injection and the simultaneous determination of trace elements by ICP-MS. ANALYTICAL SCIENCES 2008;24(5):631-635.

Noguchi O, Oshima M, Motomizu S. Enrichment with air-sandwiched method of on-line collection/concentration using chelating resin and simultaneous determination of trace elements by inductively coupled plasma atomic emission spectrometry. TALANTA 2009;78(4-5):1235-1239.

Shuttleworth S. LA-ICP-MS: The ideal tool trace element fingerprinting of solid forensic materials. Mid-Atlantic Association of Forensic Scientists Annual Meeting: 2009.

van der Peijl G, van Breukelen M, van Es A, Wiarda W. Reporting of forensic IRMS/ICPMS results in The Netherlands. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Yang XJ, Low GK. Validation of a digestion procedure for ICP-AES and dynamic reaction cell ICP-MS for trace elemental analysis in environmental samples. ENVIRONMENTAL CHEMISTRY LETTERS 2009;7(4):381-387.

Infrared and Near Infrared Spectroscopy (including Terahertz Spectroscopy):

Adam C. Shedding light on evidence: Forensic applications of UV/visible spectroscopy. SPECTROSCOPY EUROPE 2009;21(2):13-16.

Ali HR, Edwards HG, Scowen IJ. Noninvasive in situ identification and band assignments of some pharmaceutical excipients inside USP vials with FT-near-infrared spectroscopy. SPECTROCHIMICA ACTA, PART A: MOLECULAR AND BIOMOLECULAR SPECTROSCOPY 2009;72(4):890-896.

Bradley M, Izzia F, Nunn S. Analysis of mixtures by FT-IR: Spatial and spectral separation of complex samples. SPECTROSCOPY 2008;20-22:24-26.

Bukowski EJ, Monti JA. FTIR-ATR spectroscopy for identification of illicit drugs seized from clandestine laboratories. AMERICAN LABORATORY 2007;39(20):16-17,19.

Burnett AD, Fan WH, Upadhya PC, Cunningham JE, Hargreaves MD, Munshi T, Edwards HGM, Linfield EH, Davies AG. Broadband terahertz time-domain spectroscopy of drugs-of-abuse and the use of principal component analysis. ANALYST 2009;134(8):1658-1668.

Clark D, Pysik A. The analysis of pharmaceutical substances and formulated products by vibrational spectroscopy. APPLICATIONS OF VIBRATIONAL SPECTROSCOPY IN PHARMACEUTICAL RESEARCH AND DEVELOPMENT 2007;213-238.

Dolbnev, DV, Dorofeev VL, Arzamastsev SP, Azimova ID, Vakhtel AV, Stepanova EV. Use of near-infrared spectrophotometry (NIR) for identification of pharmaceutical drugs. VOPROSY BIOLOGICHESKOI, MEDITSINSKOI IFARMATSEVTICHESKOI KHIMII 2008;(6):27-30.

El-Bardicy MC, Lotfy HM, El-Sayed MA, El-Tarras MF. Smart stability-indicating spectrophotometric methods for determination of binary mixtures without prior separation. JOURNAL OF AOAC INTERNATIONAL 2008;91(2):299-310.

Galloway CM, Le Ru EC, Etchegoin PG. An iterative algorithm for background removal in spectroscopy by wavelet transforms. APPLIED SPECTROSCOPY 2009;63(12):1370-1376.

Kazarian SG, Chan KLA. Micro- and macro-attenuated total reflection Fourier transform

infrared spectroscopic imaging. APPLIED SPECTROSCOPY 2010;64(5):135A-152A.

Kocak A, Lucania JP, Berets SL. Some advances in Fourier transform infrared transflection analysis and potential applications in forensic chemistry. APPLIED SPECTROSCOPY 2009;63(5):507-511.

Lanzarotta A, Baumann L, Story GM, Witkowski MR, Khan F, Sommers A, Sommer AJ. Rapid molecular imaging using attenuated total internal reflection planar array infrared spectroscopy for the analysis of counterfeit pharmaceutical tablets. APPLIED SPECTROSCOPY 2009;63(9):979-991.

Lei Y, Luo ZY, Hu CQ. Rapidly screening counterfeit drugs using near infrared spectroscopy: Combining qualitative analysis with quantitative analysis to increase effectiveness. JOURNAL OF NEAR INFRARED SPECTROSCOPY 2008;16(3):349-355.

Li X, Liu B, Zhu K, Tu D. The application of near infrared spectral characteristic peaks in counterfeit drugs analysis. ZHONGGUO YAOSHI (BEIJING, CHINA) 2008;22(7):558-9.

Lin ACY, Hsieh HM, Tsai LC, Linacre A, Lee JCI. Forensic applications of infrared imaging for the detection and recording of latent evidence. JOURNAL OF FORENSIC SCIENCES 2007;52(5):1148-1150.

Liu GF, Zhao FW, Ge M, Wang WF. Application of terahertz time domain spectroscopy to explosive and illegal drug. SPECTROSCOPY AND SPECTRAL ANALYSIS 2008;28(5):966-969.

Ng PH, Walker S, Tahtouh M, Reedy B. Detection of illicit substances in fingerprints by infrared spectral imaging. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009.

Polli JE, Hoag SW, Flank S. Near-infrared spectrophotometric comparison of authentic and suspect pharmaceuticals. PHARMACEUTICAL TECHNOLOGY 2009;33(8):46-52.

Puchert T, Lochmann D, Menezes JC, Reich G. Near-infrared chemical imaging (NIR-CI) for counterfeit drug identification - A four-stage concept with a novel approach of data processing (Linear Image Signature). JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSES 2009;51(1):138-145.

Roggo Y, Gendrin C, Spiegel C. Near infrared chemical imaging for the pharmaceutical industry. SPECTRA ANALYSE 2007;36(258):26-30.

Rutlidge HT, Reedy BJ. Classification of heterogeneous solids using infrared hyperspectral imaging. APPLIED SPECTROSCOPY 2009;63(2):172-179.

Sadlej-Sosnowska N, Ocios A. Selectivity of identification of sugars using IR spectroscopy. CHEMIA ANALITYCZNA 2008;53(5):639-649.

Sakamoto T, Fujimaki Y, Kawanishi T, Hiyama Y. An approach for qualitative analysis of pharmaceuticals using diffusion reflectance NIR spectroscopy. IYAKUHIN KENKYU 2009;40(7):387-401.

Sasaki Y, Hayashi A, Otani C, Kawase K. Noninvasive mail inspection system with terahertz radiation. APPLIED SPECTROSCOPY 2009;63(1):81-86.

Sato C, Furube A, Katoh R, Nonaka H, Inoue H. Non-destructive and discriminating identification of illegal drugs by transient absorption spectroscopy in the visible and near-IR wavelength range. JAPANESE JOURNAL OF APPLIED PHYSICS 2008;47(11):8583-8589.

Shi ZQ, Anderson CA. Application of Monte Carlo simulation-based photon migration for enhanced understanding of near-infrared (NIR) diffuse reflectance. Part I: Depth of penetration in pharmaceutical materials. JOURNAL OF PHARMACEUTICAL SCIENCES 2010;99(5):2399-2412.

Storme-Paris I, Clarot I, Esposito S, Chaumeil JC, Nicolas A, Brion F, Rieutord A, Chaminade P. Near infrared spectroscopy homogeneity evaluation of complex powder blends in a small-scale pharmaceutical preformulation process, a real-life application. EUROPEAN JOURNAL OF PHARMACEUTICS AND BIOPHARMACEUTICS 2009;72(1):189-198.

Storme-Paris I, Rebiere H, Matoga M, Civade C, Bonnet PA, Tissier MH, Chaminade P. Challenging near infrared spectroscopy discriminating ability for counterfeit pharmaceuticals detection. ANALYTICA CHIMICA ACTA 2010;658(2):163-174.

Wang L, Li SB, Meng JS, Hu C. Identification of counterfeit drugs by direct near-infrared spectra comparison. ZHONGGUO YAOSHI 2008;22(8):668-671.

West MJ, Went MJ. The spectroscopic detection of drugs of abuse on textile fibres after recovery with adhesive lifters. FORENSIC SCIENCE INTERNATIONAL 2009;189(1-3):100-103.

Ion Mobility Spectrometry:

Geraghty E, Kekukh V, Bunker SN. Nitrovanillin calibration agent for trace analyses using ion mobility spectrometry. US Appl. 2007/6,246;31 December 2007.

Kanu AB, Hill HH. Identity confirmation of drugs and explosives in ion mobility spectrometry using a secondary drift gas. TALANTA 2007;73:692-699.

Khayamian T, Jafari MT. Design for electrospray ionization - ion mobility spectrometry. ANALYTICAL CHEMISTRY 2007;79(8):3199.

Sherma J, John D, Larkin FH. Ion mobility spectrometry (IMS) and IMS/MS. JOURNAL OF AOAC INTERNATIONAL 2009;92(5):163A-168A.

Mass Spectrometry (including Ambient Pressure Techniques and Isotope Ratio):

Alimpiev S, Grechnikov A, Sunner J, Borodkov A, Karavanskii V, Simanovsky Y, Nikiforov S. Gas chromatography/surface-assisted laser desorption ionization mass spectrometry of amphetamine-like compounds. ANALYTICAL CHEMISTRY 2009;81(3):1255-1261.

Andrade FJ, Shelley JT, Wetzel WC, Webb MR, Gamez G, Ray SJ, Hieftje GM. Atmospheric pressure chemical ionization source. 2. Desorption-ionization for the direct analysis of solid compounds. ANALYTICAL CHEMISTRY 2008;80(8):2654-2663.

Binette MJ, Lafontaine P, Vanier M, Ng LK. Characterization of Canadian cigarettes using multi-stable isotope analysis by gas chromatography - isotope ratio mass spectrometry. JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY 2009.

Calderone G, Serra F, Lees M, Mosandl A, Reniero F, Guillou C, Moreno-Rojas JM. Inter-laboratory comparison of elemental analysis and gas chromatography / combustion / isotope ratio mass spectrometry. II. delta N-15 measurements of selected compounds for the development of an isotopic Grob test. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(7):963-970.

Carter JF, Hill JC, Doyle S, Lock C. Results of four inter-laboratory comparisons provided by the Forensic Isotope Ratio Mass Spectrometry (FIRMS) network. SCIENCE & JUSTICE 2009;49(2):127-137.

Chen HW, Zheng J, Zhang X, Luo MB, Wang ZC, Qiao XL. Surface desorption atmospheric pressure chemical ionization mass spectrometry for direct ambient sample analysis without toxic chemical contamination. JOURNAL OF MASS SPECTROMETRY 2007;42(8):1045-1056.

Collin OL. Development of a novel tandem mass spectrometry technique for forensic and biological applications. Avail UMI Order NO. DA3292877 2007;68(12):7978.

Collins M, Cawley A, Salouros H, Heagney A, Swan H, Vujic S. Stable isotope ratio methodologies for illicit drug intelligence programs. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Cotte-Rodriguez I, Mulligan CC, Cooks G. Non-proximate detection of small and large molecules by desorption electrospray ionization and desorption atmospheric pressure chemical ionization mass spectrometry: Instrumentation and applications in forensics, chemistry, and biology. ANALYTICAL CHEMISTRY 2007;79(18):7069-7077.

Dove A. Mass spectrometry raises the bar. SCIENCE 2010;328(5980):920-922.

Doyle S. Special issue: Forensic application of isotope ratio mass spectrometry (IRMS). SCIENCE & JUSTICE 2009;49(2):61-61.

Ehleringer JR, Cerling TE, West JB, Podlesak DW, Chesson LA, Bowen GJ. Spatial considerations of stable isotope analyses in environmental forensics. ISSUES IN ENVIRONMENTAL SCIENCE AND TECHNOLOGY 2008;26:36-53.

Galhena AS, Harris GA, Nyadong L, Murray KK, Fernandez FM. Small molecule ambient mass spectrometry imaging by infrared laser ablation metastable-induced chemical ionization. ANALYTICAL CHEMISTRY 2010:82(6):2178-2181.

Galimov E, Sevastyanov V, Kuznetsova O. Isotope ratio mass spectrometry for tracing the origin of forensic agents. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Grange AH. An integrated wipe sample transport/autosampler to maximize for a direct

analysis in real time (DART) / orthogonal acceleration, time-of-flight mass spectrometer (OA-TOFMS). ENVIRONMENTAL FORENSICS 2008;9(2-3):137-143.

Green FM, Salter TL, Stokes P, Gilmore IS, O'Connor G. Ambient mass spectrometry: advances and applications in forensics. SURFACE AND INTERFACE ANALYSIS 2010;42(5):347-357.

Haapala M, Pol J, Saarela V, Arvola V, Kotiaho T, Ketola RA, Franssila S, Kauppila TJ, Kostiainen R. Desorption atmospheric pressure photoionization. ANALYTICAL CHEMISTRY 2007;79(20):7867-7872.

Hoogewerff J. The use of strontium isotope ratios and biological profiling for forensic provenancing of soils. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Ifa DR, Jackson AU, Paglia G, Cooks RG. Forensic applications of ambient ionization mass spectrometry. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;394(8):1995-2008.

Ifa DR, Wu CP, Ouyang Z, Cooks RG. Desorption electrospray ionization and other ambient ionization methods: Current progress and preview. ANALYST 2010;135(4):669-681.

Ishii A, Kaneko R, Hirata Y, Hamajima M. Application of new mass spectrometric techniques to legal medicine. JOURNAL OF THE MASS SPECTROMETRY SOCIETY OF JAPAN 2008;56(3):131-138.

Jurschik S, Tani A, Sulzer P, Haidacher S, Jordan A, Schottkowsky R, Hartungen E, Hanel G, Seehauser H, Mark L, Mark TD. Direct aqueous injection analysis of trace compounds in water with proton-transfer-reaction mass spectrometry (PTR-MS). INTERNATIONAL JOURNAL OF MASS SPECTROMETRY 2010;289(2-3):173-176.

Kala M. Forensic sciences. MASS SPECTROMETRY 2009:309-319.

Kauppila TJ, Arvola V, Haapala M, Pol J, Aalberg L, Saarela V, Franssila S, Kotiaho T, Kostiainen R. Direct analysis of illicit drugs by desorption atmospheric pressure photoionization. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2008;22(7):979-985.

Kauppila TJ, Kostiainen R, Kotiaho T, Laakkonen UM, Luosujarvi L. Analysis of street market confiscated drugs by desorption atmospheric pressure photoionization and desorption electrospray ionization coupled with mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(9):1401-1404.

Kawamura M, Kikura-Hanajiri R, Goda Y. Simple and rapid screening for psychotropic natural products using direct analysis in real time (DART)-TOFMS. YAKUGAKU ZASSHI - JOURNAL OF THE PHARMACEUTICAL SOCIETY OF JAPAN 2009;129(6):719-725.

Kennedy C, Bowen GJ, Ehleringer JR. Characterizing temporal variations in the isotopic composition of human drinking water. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Kertesz V, Van Berkel GJ. Improved desorption electrospray ionization mass spectrometry performance using edge sampling and a rotational sample stage. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2008;22(23):3846-3850.

Kertesz V, Van Berkel GJ. Improved imaging resolution in desorption electrospray ionization mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2008;22(17):2639-2644.

Landwehr J, Coplen TB. Spatial and seasonal variability of stable isotopic compositions of tap waters throughout the United States. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Liu K, Ma B, Wang Y, Chen X, Zhong D. A new software method for accurate mass measurements of drugs on unit mass resolution mass spectrometer. YAOXUE XUEBAO 2007;42(10):1112-1114.

Liu YY, Lin ZQ, Zhang SC, Yang CD, Zhang XR. Rapid screening of active ingredients in drugs by mass spectrometry with low-temperature plasma probe. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;395(3):591-599.

Luosujarvi L, Laakkonen UM, Kostiainen R, Kotiaho T, Kauppila TJ. Analysis of street market confiscated drugs by desorption atmospheric pressure photoionization and desorption electrospray ionization coupled with mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(9):1401-1404.

Martin AN, Farquar GR, Jones AD, Frank M. The non-destructive identification of solid over-the-counter medications using single particle aerosol mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2007;21(22):3561-3568.

Martin AN, Farquar GR, Steel PT, Fergenson DP, Gard EE. The rapid non-destruction identification of drug tablets using single particle aerosol mass spectrometry. 2008 American Academy of Forensic Sciences Annual Meeting.

Martin AN, Farquar GR, Steele PT, Jones AD, Frank M. Use of single particle aerosol mass spectrometry for the automated nondestructive identification of drugs in multicomponent samples. ANALYTICAL CHEMISTRY 2009;81(22):9336-9342.

Miao ZX, Chen H. Direct analysis of liquid samples by desorption electrospray ionization-mass spectrometry (DESI-MS). JOURNAL OF THE AMERICAN SOCIETY FOR MASS SPECTROMETRY 2009;20(1):10-19.

Mitsui T. Effective use of mass spectrometry in scientific criminal investigation. JOURNAL OF THE MASS SPECTROMETRY OF JAPAN 2008;56(3):117-122.

Muccio Zeland, Jackson GP. Isotope ratio mass spectrometry. ANALYST 2009;134(2):213-222.

Mylonas R, Mauron Y, Masselot A, Binz PA, Budin N, Fathi M, Viette V, Hochstrasser DF, Lisacek F. X-Rank: A robust algorithm for small molecule identification using tandem mass spectrometry. ANALYTICAL CHEMISTRY 2009;81(18):7604-7610.

Nilles JM, Connell TR, Durst HD. Thermal separation to facilitate direct analysis in real time (DART) of mixtures. ANALYST 2010;135(5):883-886.

Oberacher H, Pavlic M, Libiseller K, Schubert B, Sulyok M, Schuhmacher R, Csaszar E, Kofeler HC. On the inter-instrument and inter-laboratory transferability of a tandem mass spectral reference library: 1. Results of an Austrian multicenter study. JOURNAL OF MASS SPECTROMETRY 2009;44(4):485-493.

Petucci C, Diffendal J, Kaufman D, Mekonnen B, Terefenko G, Musselman B. Direct analysis in real time for reaction monitoring in drug discovery. ANALYTICAL CHEMISTRY 2007;79(13):5064-5070.

Philip RP, Kuder T. The evolution of stable isotope applications in environmental

forensics-past, present and future. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Rao RM, Parab AR, Aggarwal SK. A study on the determination of strontium isotopic ratio by thermal ionization mass spectrometry using single as well as multiple filament assembly. BARC NEWSLETTER 2007;285:80-83.

Ratcliffe LV, Rutten FJM, Barrett DA, Whitmore T, Seymour D, Greenwood C, Aranda-Gonzalvo Y, Robinson S, McCoustra M. Surface analysis under ambient conditions using plasma-assisted desorption/ionization mass spectrometry. ANALYTICAL CHEMISTRY 2007;79(16):6094-6101.

Rodriguez-Cruz SE, Carson KA. Anion identification via complexation with meso-octamethylcalix(4)pyrrole and detection using electrospray ionization mass spectrometry. JOURNAL OF FORENSIC SCIENCES 2010;55(2):499-507.

Rodriguez-Cruz SE. Rapid screening of seized drug exhibits using desorption electrospray ionization mass spectrometry (DESI-MS). MICROGRAM JOURNAL 2008;6(1-2):10.

Shen C, Li J, Wang H, Han H, Xu G, Zheng P, Wang Y, Li H, Chu Y. Real-time measurements of the drug precursor chemicals with proton transfer reaction mass spectrometry. HUNAN DAXUE XUEBAO, ZIRAN KEXUEBAN 2009;36(2):75-79.

Soparawalla S, Salazar GA, Perry RH, Nicholas M, Cooks RG. Pharmaceutical cleaning validation using non-proximate large-area desorption electrospray ionization mass spectrometry. RAPID COMMUNICATIONS IN MASS SPECTROMETRY 2009;23(1):131-137.

Steiner RR, Larson RL. Validation of the direct analysis in real time source for use in forensic drug screening. JOURNAL OF FORENSIC SCIENCES 2009;54(3):617-622.

Talaty N, Mulligan CC, Justes DR, Jackson AU, Noll RJ, Cooks RG. Fabric analysis by ambient mass spectrometry for explosives and drugs. ANALYST 2008;133(11):1532-1540.

Thevis M, Schrader Y, Thomas A, Sigmund G, Geyer H, Schaenzer W. Analysis of confiscated black market drugs using chromatographic and mass spectrometric approaches. JOURNAL OF ANALYTICAL TOXICOLOGY 2008;32(3):232-240.

Van der Veer G, Voerkelius S, Lorentz G, Heiss G, Hoogewerff JA. Spatial interpolation of the deuterium and oxygen-18 composition of global precipitation using temperature as ancillary variable. JOURNAL OF GEOCHEMICAL EXPLORATION 2009;101(2):175-184.

Walker GS. Combining light isotope, trace element and isotope of metals in environmental and forensic investigations. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

West BJ, Ehleringer JR, Kreuzer HM, Hurley JM, Cerling TE. Provenancing plant materials form isoscapes. The Fourth Forensic Isotope Ratio Mass Spectrometry Conference: 2010.

Weston DJ. Ambient ionization mass spectrometry: Current understanding of mechanistic theory; analytical performance and application areas. ANALYST 2010;135(4):661-668.

Wiseman JM, Laughlin BC. Desorption electrospray ionization (DESI) mass spectrometry: A brief introduction and overview. CURRENT SEPARATIONS AND DRUG DEVELOPMENT 2007;22(1):11.

Microchip Technology:

Bell SC, Hanes RD. A microfluidic device for presumptive testing of controlled substances. JOURNAL OF FORENSIC SCIENCES 2007;52(4):884-888.

Klenkar G, Liedberg B. A microarray chip for label-free detection of narcotics. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2008;391(5):1679-1688.

Nuclear Magnetic Resonance Spectroscopy:

Beyer T, Schollmayer C, Holzgrabe U. The role of solvents in the signal separation for quantitative H-1 NMR spectroscopy. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2010;52(1):51-58.

Charlton AJ, Robb P, Donarski JA, Godward J. Non-targeted detection of chemical contamination in carbonated soft drinks using NMR spectroscopy, variable selection and chemometrics. ANALYTICA CHIMICA ACTA 2008;618(2):196-203.

Chen SN, Turner A, Jaki BU, Nikolic D, van Breemen RB, Friesen JB, Pauli GF. An experimental implementation of chemical subtraction. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;46(4):692-698.

Claridge TDW, Davies SG, Polywka MEC, Roberts PM, Russell AJ, Savory ED, Smith AD. "Pure by NMR"? ORGANIC LETTERS 2008;10(23):5433-5436.

Dai B, Eads CD. Efficient removal of unwanted signals in NMR spectra using the filter diagonalization method. MAGNETIC RESONANCE IN CHEMISTRY 2010;48(3):230-234.

Dalisay DS, Molinski TF. NMR quantitation of natural products at the nanomole scale. JOURNAL OF NATURAL PRODUCTS 2009;72(4):739-744.

de Brouwer H. Evaluation of algorithms for automated phase correction of NMR spectra. JOURNAL OF MAGNETIC RESONANCE 2009;201(2):230-238.

Hays PA, Thompson RA. A processing method enabling the use of peak height for accurate and precise proton NMR quantitation. MAGNETIC RESONANCE IN CHEMISTRY 2009;47(10):819-824.

Henderson TJ. Feasibility study for the rapid screening of target molecules using translational diffusion coefficients: Diffusion-ordered NMR spectroscopy of biological toxins. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2010;396(4):1465-1471.

Mo HP, Harwood JS, Raftery D. Receiver gain function: The actual NMR receiver gain. MAGNETIC RESONANCE IN CHEMISTRY 2010;48(3):235-238.

Mo HP, Raftery D. Solvent signal as an NMR concentration reference. ANALYTICAL CHEMISTRY 2008;80(24):9835-9839.

Ozdemir MS, De Deene Y, Fieremans E, Lemahieu I. Quantitative proton magnetic resonance spectroscopy without water suppression. JOURNAL OF INSTRUMENTATION 2009;4.

Pantoja-Uceda D, Santoro J. Aliasing in reduced dimensionality NMR spectra: (3,2)D HNHA and (4,2)D HN(COCA)NH experiments as examples. JOURNAL OF BIOMOLECULAR NMR 2009;45(4):351-356.

Pauli GF, Jaki BU, Lankin DC. A routine experimental protocol for qHNMR illustrated with taxol. JOURNAL OF NATURAL PRODUCTS 2007;70(4):589-595.

Pierens GK, Carroll AR, Davis RA, Palframan ME, Quinn RJ. Determination of analyte concentration using the residual solvent resonance in H-1 NMR spectroscopy. JOURNAL OF NATURAL PRODUCTS 2008;71(5):810-813.

Rubtsov DV, Griffin JL. Time-domain Bayesian detection and estimation of noisy damped sinusoidal signals applied to NMR spectroscopy. JOURNAL OF MAGNETIC RESONANCE 2007;188:367-379.

Silvestre V, Mboula VM, Jouitteau C, Akoka S, Robins RJ, Remaud GS. Isotopic C NMR spectrometry to assess counterfeiting of active pharmaceutical ingredients: Site-specific C content of aspirin and paracetamol. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;50(3):336-341.

Son H, Hwang G, Ahn H, Park W, Lee C, Hong Y. Characterization of wines from grape varieties through multivariate statistical analysis of H-1 NMR spectroscopic data. FOOD RESEARCH INTERNATIONAL 2009;42(10):1483-1491.

Stanek J, Kozminski W. Iterative algorithm of discrete Fourier transform for processing randomly sampled NMR data sets. JOURNAL OF BIOMOLECULAR NMR 2010;47(1):65-77.

Stern AS, Donoho DL, Hoch JC. NMR data processing using iterative thresholding and minimum l(1)-norm reconstruction. JOURNAL OF MAGNETIC RESONANCE 2007;188:295-300.

Trefi S, Gilard V, Balayssac S, Malet-Martino M, Martino R. The usefulness of 2D DOSY and 3D DOSY-COSY H NMR for mixture analysis: Application to genuine and fake formulations of sildenafil (Viagra). MAGNETIC RESONANCE IN CHEMISTRY 2009;47(S1):S163-S173.

Trefi S, Routaboul C, Hamieh S, Gilard V, Malet-Martino M, Martino R. Analysis of illegally manufactured formulations of tadalafil (Cialis) by H NMR, 2D DOSY H NMR and Raman spectroscopy. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;47(1):103-113.

Wang T, Shao K, Chu QY, Ren YF, Mu YM, Qu LJ, He J, Jin CW, Xia B. Automics:

An integrated platform for NMR-based metabonomics spectral processing and data analysis. BMC BIOINFORMATICS 2009;10.

Webster GK, Marsden I, Pommerening CA, Tyrakowski CM, Tobias B. Determination of relative response factors for chromatographic investigations using NMR spectrometry. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;49(5):1261-1265.

Webster GK, Marsden I, Pommerening CA, Tyrakowski CM. Validation of pharmaceutical potency determinations by quantitative nuclear magnetic resonance spectrometry. APPLIED SPECTROSCOPY 2010;64(5):537-542.

Raman Spectroscopy:

Ali EMA, Edwards HGM, Hargreaves MD, Scowen IJ. In-situ detection of drugs-of-abuse on clothing using confocal Raman microscopy. ANALYTICA CHIMICA ACTA 2008;615(1):63-72.

Anonymous. Innovative use of Raman spectroscopy as a forensic tool. BIOANALYSIS 2009;1(7):1189.

Bell SEJ, Sirimuthu NMS. Quantitative surface-enhanced Raman spectroscopy. CHEMICAL SOCIETY REVIEWS 2008;37(5):1012-1024.

Buckley K, Goodship A, MacLeod NA, Parker AW, Matousek P. Technique for enhancing signal in conventional backscattering fluorescence and Raman spectroscopy of turbid media. ANALYTICAL CHEMISTRY 2008;80(15):6006-6009.

Clelland BL. Forensic applications of Raman microspectroscopy, capillary electro-phoresis, chromatography, and mass spectrometry for the analysis of textile fibers, dyes, illicit drugs, and anticoagulant rodenticides. DISSERTATION ABSTRACTS INTERNATIONAL, B 2007;67(9):5041.

de Veij M, Deneckere A, Vandenabeele P, de Kaste D, Moens L. Detection of counterfeit Viagra with Raman spectroscopy. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;46(2):303-309.

De Veij M, Vandenabeele P, Moens L. Detection of counterfeit erectile dysfunction drugs with Raman spectroscopy. SPECTROSCOPY EUROPE 2008;20(3):7-10.

De Veij M, Vandenabelle P, DeBeer T, Remon JP, Moens L. Reference database of Raman spectra of pharmaceutical excipients. JOURNAL OF RAMAN SPECTROSCOPY 2009;40(3):297-307.

Efremov EV, Ariese F, Gooijer C. Achievements in resonance Raman spectroscopy - Review of a technique with a distinct analytical chemistry potential. ANALYTICA CHIMICA ACTA 2008;606(2):119-134.

Hargreaves MD, Burnett AD, Munshi T, Cunningham JE, Linfield EH, Davies AG, Edwards HGM. Comparison of near infrared laser excitation wavelengths and its influence on the interrogation of seized drugs-of-abuse by Raman spectroscopy. JOURNAL OF RAMAN SPECTROSCOPY 2009;40(12):1974-1983.

Hargreaves MD, Page K, Munshi T, Tomsett R, Lynch G, Edwards HGM. Analysis of seized drugs using portable Raman spectroscopy in an airport environment - A proof of principle study. JOURNAL OF RAMAN SPECTROSCOPY 2008;39(7):873-880.

Kiefer W. Recent advances in linear and non-linear Raman spectroscopy. Part III. JOURNAL OF RAMAN SPECTROSCOPY 2009;40(12):1766-1779.

MacLeod NA, Matousek P. Emerging non-invasive Raman methods in process control and forensic applications. PHARMACEUTICAL RESEARCH 2008;25(10):2205-2215.

McGoverin CM, Rades T, Gordon KC. Recent pharmaceutical applications of Raman and terahertz spectroscopies. JOURNAL OF PHARMACEUTICAL SCIENCES 2008;97(11):4598-4621.

Noonan KY, Tonge LA, Fenton OS, Damiano DB, Frederick KA. Rapid classification of simulated street drug mixtures using Raman spectroscopy and principal component analysis. APPLIED SPECTROSCOPY 2009;63(7):742-747.

Otieno-Alego V. Some forensic applications of a combined micro-Raman and scanning electron microscopy system. JOURNAL OF RAMAN SPECTROSCOPY 2009;40(8):948-953.

Roggo Y, Degardin K, Margot P. Identification of pharmaceutical tablets by Raman spectroscopy and chemometrics. TALANTA 2010;81(3):988-995.

Virtanen S, Antikainen O, Yliruusi J. Determination of the crushing strength of intact

tablets using Raman spectroscopy. INTERNATIONAL JOURNAL OF PHARMACEUTICS 2008;360(1-2):40-46.

Solid Phase Micro-Extraction (Headspace Techniques and Solvent Analysis):

Andrasko J. Some examples of applications of a microthermal desorption device in the forensic laboratory. JOURNAL OF FORENSIC SCIENCES 2009;54(5):1055-1058.

Beam KN, Brettell TA. Forensic applications of headspace single-drop microextraction. 2008 American Academy of Forensic Sciences Annual Meeting.

Baliyan PK, Singh RP, Arora S. Simultaneous estimation of residual solvents (ethanol, acetone, dichloromethane and ethyl acetate) in dosage form by GC-HS-FID. ASIAN JOURNAL OF CHEMISTRY 2009;21(8):5851-5857.

Kang XJ, Chen LQ, Zhang YY, Liu YW, Gu ZZ. Performance of electrospun nanofibers for SPE of drugs from aqueous solutions. JOURNAL OF SEPARATION SCIENCE 2008;31(18):3272-3278.

Lai H, Guerra P, Joshi M, Almirall JR. Analysis of volatile components of drugs and explosives by solid phase microextraction-ion mobility spectrometry. JOURNAL OF SEPARATION SCIENCE 2008;31(2):402-412.

Lai H, Corbin I, Almirall JR. Headspace sampling and detection of cocaine, MDMA, and marijuana via volatile markers in the presence of potential interferences by solid phase microextraction-ion mobility spectrometry (SPME-IMS). ANALYTICAL AND BIOANALYTICAL CHEMISTRY 2008;392(1-2):105-113.

Lai HT, Almirall JR. Headspace sampling and detection of cocaine, MDMA, and marijuana via volatile chemical markers; solid phase microextraction-ion mobility spectrometry. 2008 American Academy of Forensic Sciences Annual Meeting.

Misharina TA. Determination of volatile organics in gaseous phase using porous adsorbents. JOURNAL OF ANALYTICAL CHEMISTRY 2010;65(2):127-134.

Ouyang G, Pawliszyn J. A critical review in calibration methods for solid-phase microextraction. ANALYTICA CHIMICA ACTA 2008;627(2):184-197.

Snow NH, Bullock GP. Novel techniques for enhancing sensitivity in static headspace

extraction-gas chromatography. JOURNAL OF CHROMATOGRAPHY A 2010;1217(16):2726-2735.

Wang YW, McCaffrey J, Norwood DL. Recent advances in headspace gas chromatography. JOURNAL OF LIQUID CHROMATOGRAPHY & RELATED TECHNOLOGIES 2008;31(11-12):1823-1851.

Thin Layer Chromatography:

Gheorghe M, Balalau D, Ilie M, Baconi DL, Ciobanu AM. Qualitative analysis of confiscated illegal drugs by thin-layer chromatography. FARMACIA 2008;56(5):541-546.

Sherma J. Analysis of counterfeit drugs by thin layer chromatography. ACTA CHROMATOGRAPHICA 2007;19:5-20.

Turkmen Z, Mercan S, Tutanc L. Simultaneous high performance thin layer chromatographic determination of heroin, morphine, cocaine, and MDMA. 2008 American Academy of Forensic Sciences Annual Meeting.

X-Ray based Techniques:

Causin V, Marega C, Carresi P, Schiavone S, Marigo A. A quantitative differentiation method for plastic bags by wide angle X-ray diffraction for tracing the source of illegal drugs. FORENSIC SCIENCE INTERNATIONAL 2007;168(1):37-41.

Cook E, Fong R, Horrocks J, Wilkinson D, Speller R. Energy dispersive X-ray diffraction as a means to identify illicit materials: A preliminary optimization study. APPLIED RADIATION AND ISOTOPES 2007;65(8):959.

Kotrly M. Using X-ray diffraction in forensic science. ZEITSCHRIFT FUR KRISTALLOGRAPHIE 2007;222(3-4):193-198.

Moore MD, Cogdill RP, Wildfong PLD. Evaluation of chemometric algorithms in quantitative X-ray powder diffraction (XRPD) of intact multi-component consolidated samples. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2009;49(3):619-626.

Moore MD, Steinbach AM, Buckner IS, Wildfong PLD. A structural investigation into

the compaction behavior of pharmaceutical composites using powder X-ray diffraction and total scattering analysis. PHARMACEUTICAL RESEARCH 2009;26(11):2429-2437.

West M, Ellis AT, Potts PJ, Streli C, Vanhoof C, Wegrzynek D, Wobrauschek P. Atomic spectrometry update. X-ray fluorescence spectrometry. JOURNAL OF ANALYTICAL ATOMIC SPECTROMETRY 2009;24(10):1289-1326.

Miscellaneous:

Channaa H, Surmann P. Voltammetric analysis of N-containing drugs using the hanging galinstan drop electrode (HGDE). PHARMAZIE 2009;64(3):161-165.

Domenech A, Navarro P, Aran VJ, Muro B, Montoya N, Garcia-Espana E. Selective electrochemical discrimination between dopamine and phenethylamine-derived psychotropic drugs using electrodes modified with an acyclic receptor containing two terminal 3-alkoxy-5-nitroindazole rings. ANALYST 2010;135(6):1449-1455.

Ferreira FJO, Crispim VR, Silva AX. Detection of drugs and explosives using neutron computerized tomography and artificial intelligence techniques. RADIATION AND ISOTOPES 2010;68(6):1012-1017.

Frisk T, Sandstroem N, Eng L, van der Wijngaart W, Maansson P, Stemme G. An integrated QCM-based narcotics sensing microsystem. LAB ON A CHIP 2008;8(10):1648-57.

Gayton-Ely M, Shakleya DM, Bell SC. Application of a pyroprobe to simulate smoking and metabolic degradation of abused drugs through analytical pyrolysis. JOURNAL OF FORENSIC SCIENCES 2007;52(2):473.

Hodge TA. Method and apparatus for forensic screening and laboratory information management systems. U.S. Patent Application Publication US 20090275038 A1, November 2009.

Hua Q. Radiocarbon: A chronological tool for the recent past. QUATERNARY GEOCHRONOLOGY 2009;4(5):378-390.

Izake EL. Chiral discrimination and enantioselective analysis of drugs: An overview. JOURNAL OF PHARMACEUTICAL SCIENCES 2007;96(7):1659.

Jestice AL. Method and apparatus for detecting and classifying explosives and controlled substances. U.S. Pat. Appl. Publ. US 2009.

Kibar O, Chachisvilis M, Tu E, Marsilje TH. Separation and manipulation of a chiral object by rotating field. U.S. Pat. Appl. Publ. US 2008 274, 555.

Li H. Rapid detection of drugs and poisons in forensic samples. HIROSHIMA DAIGAKU IGAKU ZASSHI 2007;55(4-6):25-33.

Liang M, Shen J, Wang G. Identification of illicit drugs by using SOM neural networks. JOURNAL OF PHYSICS D: APPLIED PHYSICS 2008;41(13):135306/1-135306/6.

Molnar P, Thorey P, Bansaghi G, Szekely E, Poppe L, Tomin A, Kemeny S, Fogassy E, Simandi B. Resolution of racemic trans-1,2-cyclohexanediol with tartaric acid. TETRAHEDRON-ASYMMETRY 2008;19(13):1587-1592.

Perot B, Carasco C, Valkovic V, Sudac D, Franulovic A. Detection of illicit drugs with the EURITRACK system. AIP CONFERENCE PROCEEDINGS 2009;1099:565-569.

Reeve S, Allen S. Multicolor cavity ringdown based detection method and apparatus used for detecting gas phase molecules emanating from explosives, drugs, hazardous materials, or patient's breath. U.S. Pat. Appl. Publ. US 20090180119 A1 16 Jul 2009.

Reviriego F, Navarro P, Garcia-Espana E, Albelda MT, Frias JC, Domenech A, Yunta MJR, Costa R, Orti E. Diazatetraester 1 H-pyrazole crowns as fluorescent chemosensors for AMPH, METH, MDMA (Ecstasy), and dopamine. ORGANIC LETTERS 2008;10(22):5099-5102.

Silverio FO, Barbosa LCA, Pilo-Veloso D. Pyrolysis as an analytical technique. QUIMICA NOVA 2008;31(6):1543-1552.

Tondre C, Parant S, Lemiere P, Gerardin C. On the use of colloid-enhanced ultrafiltration in view of enantiomeric enrichments and limiting conditions. COLLOIDS AND SURFACES A-PHYSICOCHEMICAL AND ENGINEERING ASPECTS 2008;317(1-3):431-437.

VIII) Portable Detection and Analytical Instrumentation

Issue:

"Free Trade" agreements and the easing of formally restrictive national and international borders have resulted in dramatic increases in cargo transshipments and personal travel, thereby complicating drug inspection and interdiction efforts at POEs. Discovery and confirmational analysis of suspected drugs in cargo or on individuals is severely hampered by the lack of on-site detection and/or analytical equipment.

Solution:

Development of portable and highly sensitive detectors for drug detection and analyses allows law enforcement personnel and/or forensic chemists to perform screening type analyses on-site. In those cases where new methodologies have proven effective, case reports are generated for the forensic and enforcement communities.

References:

Amisar S. A reagent, a kit, and a method for detecting and identifying a wide range of illicit drugs. US 2007-2007/PV935762;30 August 2007.

Babichenko S, Ivkina T, Poryvkina L, Sominsky V. Method for on-site drug detection in illicit drug samples. PCT Int. Appl. WO 2008.

Chen X, Lian Y, Li A, Li J, Liu G, He C, Wu X, Wang H, Li H. An intelligent recognition program for in-situ detection of illicit chemicals by ion mobility spectrometry. JISUANJI YU YINGYONG HUAXUE 2007;24(9):1145-1148.

Carron K, Cox R. Qualitative analysis and the answer box: A perspective on portable Raman spectroscopy. ANALYTICAL CHEMISTRY 2010;82(9):3419-3425.

Cleary M, Vitale M. Improvements to methods of in-field analysis. APPLICATION: WO 2009-GB225 26 Jan 2009.

Eliasson C, Macleod NA, Matousek P. Non-invasive detection of powders concealed within diffusely scattering plastic containers. VIBRATIONAL SPECTROSCOPY 2008;48(1):8-11.

Grates KM, Ring JG, Savage KA, Denicola TA. Conclusion of validation study of commercially available field test kits for common drugs of abuse. 2008 American

Academy of Forensic Sciences Annual Meeting.

Guerra-Diaz P, Gura S, Almirall JR. Dynamic planar solid phase microextraction-ion mobility spectrometry for rapid field air sampling and analysis of illicit drugs and explosives. ANALYTICAL CHEMISTRY 2010;82(7):2826-2835.

O'Neil AJ, Jee RD, Lee G, Charvill A, Moffat AC. Use of a portable near infrared spectrometer for the authentication of tablets and the detection of counterfeit versions. JOURNAL OF NEAR INFRARED SPECTROSCOPY 2008;16(3):327-333.

Quest DW, Horsley J. Field-test of a date-rape drug detection device. JOURNAL OF ANALYTICAL TOXICOLOGY 2007;31(6):354.

Ramsey SA, Mustacich RV, Smith PA, Hook GL, Eckenrode BA. Directly heated high surface area solid phase microextraction sampler for rapid field forensic analyses. ANALYTICAL CHEMISTRY 2009;81(21):8724-8733.

Staples EJ, Viswanathan S. Detection of contrabands in cargo containers using a high-speed gas chromatograph with surface acoustic wave sensor. INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH 2008;47(21):8361-8367.

Wells JM, Roth MJ, Keil AD, Grossenbacher JW, Justes DR, Patterson GE, Barket DJ. Implementation of DART and DESI ionization on a fieldable mass spectrometer. JOURNAL OF THE AMERICAN SOCIETY FOR MASS SPECTROMETRY 2008;19(10):1419-1424.

Yoon SS. Portable counterfeit detector machine. PRIORITY: KR 2008-2293, 8 Jan 2008.

Zieba-Palus J, Borusiewicz R, Kunicki M. PRAXIS - Combined mu-Raman and mu-XRF spectrometers in the examination of forensic samples. FORENSIC SCIENCE INTERNATIONAL 2008;175(1):1-10.

IX) Miscellaneous

References:

Beverage Analysis:

Clark A. A device for automatically testing whether a drink has been spiked. APPLICATION: GB 2007-5716 24 March 2007.

Loane CJ. Chemical spot test for the detection of drugs of abuse in a beverage. (Patent) CHEMICAL ABSTRACTS 2007;147:501291d.

Madea B, Musshoff F. Knock-out drugs: Their prevalence, modes of action, and means of detection. DEUTSCHES ARZTEBLATT INTERNATIONAL 2009;106(20):341-U12.

Murray GM, Mason AF, Ott EW. Molecularly imprinted polymer and colorimetric indicator sensor device useful for testing presence of drugs or hormones in body fluids or beverages. U.S. Pat. Appl. Publ. US 20090197297 A16 Aug 2009.

Petrenko ES, Petrenko AE, Petrenko DE. Mode and an arrangement for prevention of carrying in a luggage through an inspection zone of liquid explosive and narcotic substances in a household package for beverage and perfumery. (Patent) CHEMICAL ABSTRACTS 2007:1405564.

Chemometrics:

Armstrong N, Hibbert DB. An introduction to Bayesian methods for analyzing chemistry data Part 1: An introduction to Bayesian theory and methods. CHEMOMETRICS AND INTELLIGENT LABORATORY SYSTEMS 2009;97(2):194-210.

Drabek J. Validation of software for calculating the likelihood ratio for parentage and kinship. FORENSIC SCIENCE INTERNATIONAL-GENETICS 2009;3(2):112-118.

Hibbert DB, Armstrong N. An introduction to Bayesian methods for analyzing chemistry data Part II: A review of applications of Bayesian methods in chemistry. CHEMO-METRICS AND INTELLIGENT LABORATORY SYSTEMS 2009;97(2):211-220.

Kafkafi N, Yekutieli D, Elmer GI. A data mining approach to in vivo classification of

psychopharmacological drugs. NEUROPSYCHOPHARMACOLOGY 2009;34(3):607-623.

Liu Q, Zhang J, Chen L, Min F, He M. Intelligent analysis method for criminal case based on relevance. APPLICATION: CN 2010-50854 17 December 2007.

Melucci D, Monti D, D'Elia M, Luciano G. Multivariate analysis of powder drugs using reflectance NIR spectrometry. CHIMICA E L'INDUSTRIA 2009;91(4):83-89.

Ratle F, Gagne C, Terrettaz-Zufferey AL, Kanevski M, Esseiva P, Ribaux O. Advanced clustering methods for mining chemical databases in forensic science. CHEMO-METRICS AND INTELLIGENT LABORATORY SYSTEMS 2008;90(2):123-131.

Zadora G. Glass analysis for forensic purposes - A comparison of classification methods. JOURNAL OF CHEMOMETRICS 2007;21(5-6):174-186.

Zadora G, Neocleous T, Aitken C. A two-level model for evidence evaluation in the presence of zeros. JOURNAL OF FORENSIC SCIENCES 2010;55(2):371-384.

Zadora G, Neocleous T. Likelihood ratio model for classification of forensic evidence. ANALYTICA CHIMICA ACTA 2009;642(1-2):266-278.

Zadora G, Wolanska-Nowak, P. Applications of Bayesian networks in forensic genetics and criminalistics. Z ZAGADNIEN NAUK SADOWYCH 2009;78:141-152.

Zadora G. Evaluation of evidence value of glass fragments by likelihood ratio and Bayesian network approaches. ANALYTICA CHIMICA ACTA 2009;642(1-2):279-290.

Counterfeit Drugs:

Balogh MP. Techniques for structure elucidation of unknowns: Finding substitute active pharmaceutical ingredients in counterfeit medicine. LC-GC NORTH AMERICA 2007;25(6):554.

Balogh MP. Techniques for structure elucidation of unknowns: Finding substitute active pharmaceutical ingredients in counterfeit medicines. LC-GC EUROPE 2008;21(2):84-95.

Dubois J, Wolff J-C, Warrack JK, Schoppelrei J, Lewis EN. NIR chemical imaging for counterfeit pharmaceutical products analysis. SPECTROSCOPY 2007;22(Suppl.):36.

Fernandez FM, Green MD, Newton PN. Prevalence and detection of counterfeit pharmaceuticals: A mini review. INDUSTRIAL & ENGINEERING CHEMISTRY RESEARCH 2008;47(3):585-590.

Fernandez FM, Hampton CY, Nyadong L, Navare A, Kwasnik M. Liquid chromatography and ambient ionization time-of-flight mass spectrometry for the analysis of genuine and counterfeit pharmaceuticals. CHEMICAL ANALYSIS 2009;173:113-132.

Francis AR, Lyle RD, Moses VL, Pichardo D. Authentication of pharmaceuticals using molecular computational identification. U.S. Pat. Appl. Publ. US 20090187364 A1 23 Jul 2009.

Kogan, V, Beckers D, Bolze J, Lehmann C, Schweim H, Steffens, K. Detection of counterfeit drugs in packaged products, for example in blister packs, by angle dispersive X-ray diffraction. Europe Patent Application, EP 2,090,883, August 2009.

Nyadong L, Harris GA, Balayssac S, Galhena AS, Malet-Martino M, Martino R, Parry RM, Wang MDM, Fernandez FM, Gilard V. Combining two-dimensional diffusion-ordered nuclear magnetic resonance spectroscopy, imaging desorption electrospray ionization mass spectrometry, and direct analysis in real-time mass spectrometry for the integral investigation of counterfeit pharmaceuticals. ANALYTICAL CHEMISTRY 2009;81(12):4803-4812.

Soltaninejad K, Faryadi M, Akhgari M, Bahmanabadi L. Chemical profile of counterfeited buprenorphine vials seized in Teheran, Iran. FORENSIC SCIENCE INTERNATIONAL 2007;172(2-3):e4.

Willis RC. Noninvasive testing for counterfeit drugs. ANALYTICAL CHEMISTRY 2007;79(5):1773.

Yi X, Yang Y. Method for identifying genuine traditional Chinese medicine based on stable isotope fingerprint. APPLICATION: CN 2010-55059;30 August 2007:9.

Dragon's Blood:

Gupta D, Bleakley B, Gupta RK. Dragon's blood: Botany, chemistry and therapeutic

uses. JOURNAL OF ETHNOPHARMACOLOGY 2008;115(3):361-380.

Wu Z, Shu T, Zhang L, Zhang Q, Zhu H. Determination of cochinchinenin C new compound of Dragon's blood with RP-HPLC. WUJING YIXUEYUAN XUEBAO 2008;17(5):417-419.

Drugs on Currency:

Armeta S, de la Guardia M. Analytical methods to determine cocaine contamination of banknotes from around the world. TRAC - TRENDS IN ANALYTICAL CHEMISTRY 2008;27(4):344-351.

Di Donati E, Martin CCS, Spinosa De Martinis B. Determination of cocaine in Brazilian paper currency by capillary gas chromatography/mass spectrometry. QUIMICA NOVA 2007;30(8):1966-1967.

Ebejer KA, Lloyd GR, Brereton RG, Carter JF, Sleeman R. Factors influencing the contamination of UK banknotes with drugs of abuse. FORENSIC SCIENCE INTERNATIONAL 2007;171(2-3):165-170.

Zuo YG, Zhang K, Wu JP, Rego C, Fritz J. An accurate and nondestructive GC method for determination of cocaine on US paper currency. JOURNAL OF SEPARATION SCIENCE 2008;31(13):2444-2450.

Education:

Anonymous. Forensic science badly lacking in the United States. Nature 2009;457(733):1071.

Boucher MA, Specht KM. A forensic-themed case study for the organic lab. JOURNAL OF CHEMICAL EDUCATION 2009;86(7):847-848.

Bowen A. Putting chemistry in context: The role of the light microscope in non-routine analysis. MICROSCOPE 2007;55(4):147-161.

Coleman WF. Molecular models of real and mock illicit drugs from a forensic chemistry activity. JOURNAL OF CHEMICAL EDUCATION 2008;85(6):880.

Harmon KJ, Miller LM, Millard JT. Crime scene investigation in the art world: The case

of the missing masterpiece. JOURNAL OF CHEMICAL EDUCATION 2009;86(7):817-819.

Harpp DN. Crime in the classroom Part IV: Conclusions. JOURNAL OF CHEMICAL EDUCATION 2008;85(6):805-806.

Hasan S, Bromfield-Lee D, Oliver-Hoyo MT, Cintron-Maldonado JA. Using laboratory chemicals to imitate illicit drugs in a forensic chemistry activity. JOURNAL OF CHEMICAL EDUCATION 2008;85(6):813-816.

Legal Issues:

Bono JP, Siegel JA. Pattern evidence and conformance to the requirements of Daubert. 2008 American Academy of Forensic Sciences Annual Meeting.

Bower CM. Forensics under fire: Are bad science and dueling experts corrupting criminal justice? SCIENCE 2008;320(5884):1722.

Malkoc E, Neuteboom W. The current status of forensic science laboratory accreditation in Europe. FORENSIC SCIENCE INTERNATIONAL 2007;167(2-3):121-126.

Melton L. Courtroom chemistry. CHEMISTRY WORLD 2007;4(11):58-61.

Moskvina TP, Usov AI Kuz'min SA. Laboratories for forensic expertise and their accreditation problems. INORGANIC MATERIALS 2008;44(14):1612-1616.

Wadell-Smith R, McGuffin VL. The need for research in forensic science. ANALYTICAL & BIOANALYTICAL CHEMISTRY 2009;394(8):1985-1986.

Quality Assurance:

Bogusz MJ. Quality assurance aspects of identification with chromatographic-mass spectrometric methods. Z ZAGADNIEN NAUK SADOWYCH 2009;77:7-19.

Gates K, Chang N, Dilek I, Jian H, Pogue S, Sreenivasan U. The uncertainty of reference standards - A guide to understanding factors impacting uncertainty, uncertainty calculations, and vendor certifications. JOURNAL OF ANALYTICAL TOXICOLOGY 2009;33(8):532-539.

Hauck WW, Abernethy DR, Williams RL. Metrologic approaches to setting acceptance criteria: Unacceptable and unusual characteristics. JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS 2008;48(3):1042-1045.

Neumann C, Margo P. New perspectives in the use of ink evidence in forensic science: Part I. Development of a quality assurance process for forensic ink analysis by HPTLC. FORENSIC SCIENCE INTERNATIONAL 2009;185(1-3):29-37.

Neumann C, Margot P. New perspectives in the use of ink evidence in forensic science Part II. Development and testing of mathematical algorithms for the automatic comparison of ink samples analysed by HPTLC. FORENSIC SCIENCE INTERNATIONAL 2009;185(1-3):38-50.

Peters FT, Drummer OH, Musshoff F. Validation of new methods. FORENSIC SCIENCE INTERNATIONAL 2007;165(2-3):216-224.

Willink R. Uncertainty in repeated measurement of a small non-negative quantity: Explanation and discussion of Bayesian methodology. ACCREDITATION AND QUALITY ASSURANCE 2010;15(3):181-188.

Sampling Plans:

Alberink I, Bolck A, Stoel RD. Comparison of frequentist methods for estimating the total weight of consignments of drugs. JOURNAL OF FORENSIC SCIENCES 2010;55(2):508-512.

Levy R, Zelkowicz A. Efficiency evaluation of a police operation to fight the drug plague: Distribution unit weight as an objective index. JOURNAL OF FORENSIC SCIENCES 2007;52(4):909.

Majid MA. Techniques in drug sampling. 2008 American Academy of Forensic Sciences Annual Meeting.

Mario JR. A probability-based sampling approach for the analysis of drug seizures composed of multiple containers of either cocaine, heroin, or cannabis. FORENSIC SCIENCE INTERNATIONAL 2010;197(1-3):105-113.

Toolmarks:

Buckleton J, Triggs C, Taroni F, Champod C, Wevers G. Experimental design for acquiring relevant data to address the issue of comparing consecutively manufactured tools and firearms. SCIENCE & JUSTICE 2008;48(4):178-181.

Nichols RG. Defending the scientific foundations of the firearms and tool mark identification discipline: Responding to recent challenges. JOURNAL OF FORENSIC SCIENCES 2007;52(3):586-594.

Nichols RG. Defending the scientific foundations of the firearms and tool mark identification discipline: Responding to recent challenges - Response. JOURNAL OF FORENSIC SCIENCES 2007;52(6):1416-1416.

Other:

Lynch JD, Arroyo SB. Risks to Colombian amphibian fauna from cultivation of coca (Erythroxylum coca): A geographical analysis. JOURNAL OF TOXICOLOGY AND ENVIRONMENTAL HEALTH-PART A-CURRENT ISSUES 2009;72(15-16):974-985.

Prevatt-Smith KM, Prisinzano TE. New therapeutic potential for psychoactive natural products. NATURAL PRODUCT REPORTS 2010;27(1):23-31.

Scherer UW, Jacobi M, Castillo J, Forstel DH. Ultra-low-level measurements of 3H and 14C in wines and champagne. RADIATION EFFECTS AND DEFECTS IN SOLIDS 2009;164(5-6):382-385.

Virtanen S, Antikainen O, Raikkonen H, Yliruusi J. Granule size distribution of tablets. JOURNAL OF PHARMACEUTICAL SCIENCES 2010;99(4):2061-2069.

Wang N, Shen C, ding P, Yi W, sun W, Liu K, Ding, X, Fu D, Yuan J. The application of bomb C in forensics: Determination of date of birth for unknown victims. DIQIU HUAXUE 2009;38(4):387-392.

Wassenaar LI, Van Wilgenburg SL, Larson K, Hobson KA. A groundwater isoscape for Mexico. JOURNAL OF GEOCHEMICAL EXPLORATION 2009;102(3):123-136.

Wu JJ. In situ test for determining whether items of real or personal property have been exposed to the manuf. of illegal drugs. APPLICATION: US2008-13558 14 January 2008.