

Emerging Trends in Synthetic Drugs: Legislation, Brands, Structures, and Approaches to Analysis in Florida

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FDLE Crime Lab - Overview



The FDLE crime lab provides timely, expert and professional examination of evidence to aid in the investigation, prosecution, and/or exclusion of criminal offenses by using scientific equipment and proven techniques.

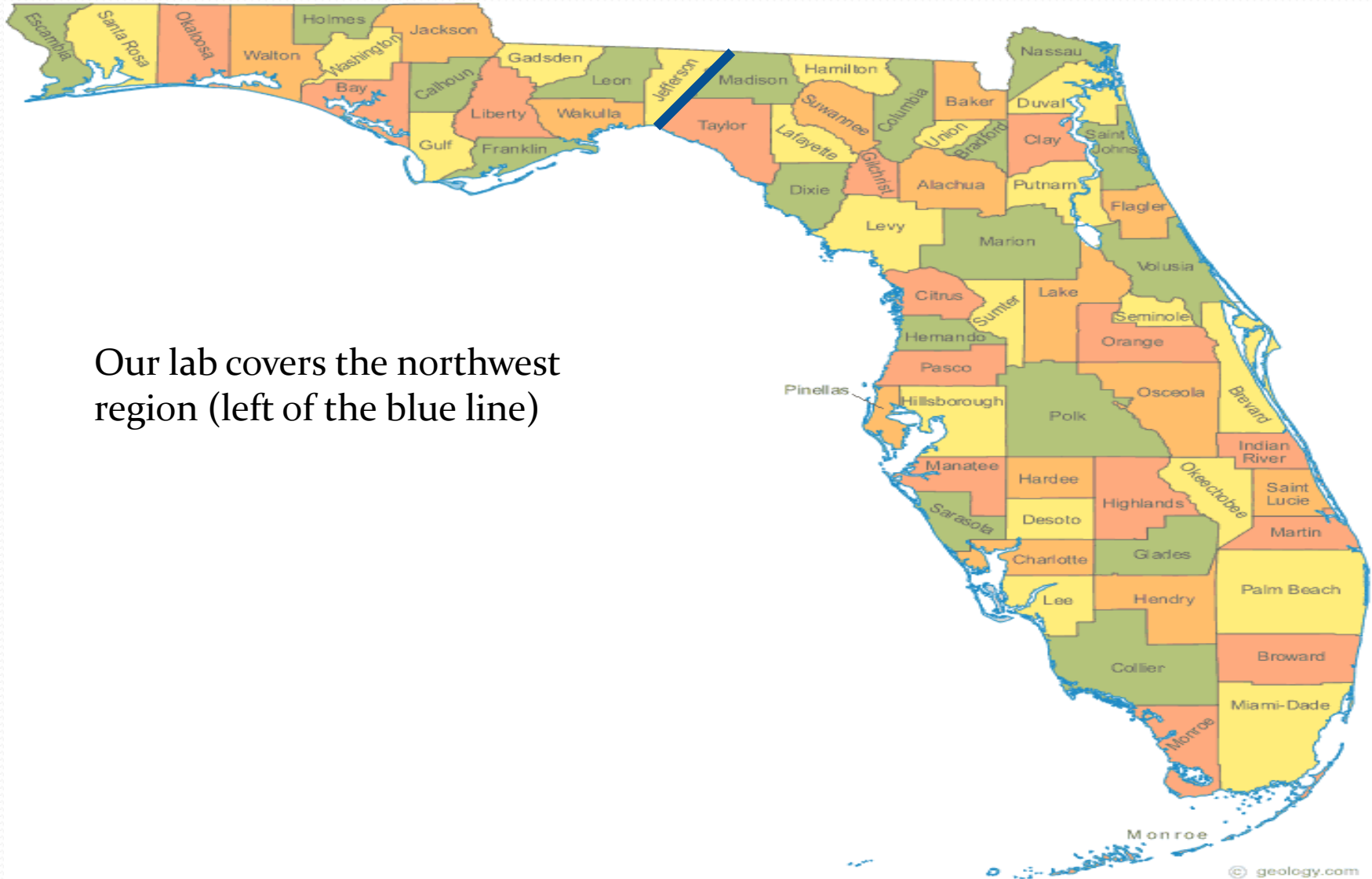
FDLE has 7 regional laboratories offering services in the following disciplines: Chemistry, Biology, Latent Prints, Firearms, Toolmarks, Crime Scene Services, Computer Evidence Recovery, Questioned Documents, Footwear/Tire Impression, Toxicology, Trace Analysis

FDLE has over 400 forensic personnel and works on average 76,000 service requests per year

FDLE - Pensacola

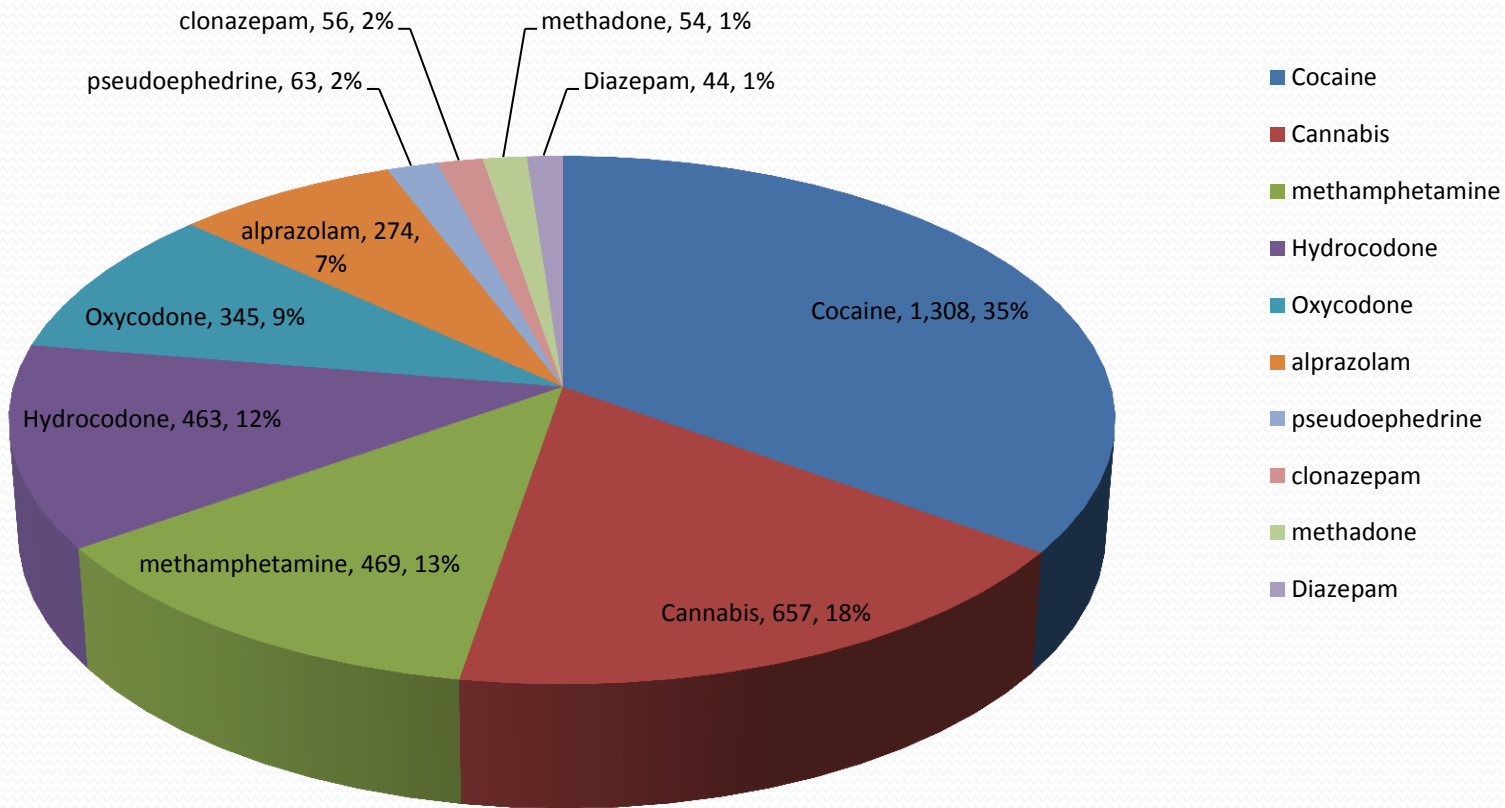
- The Chemistry lab in Pensacola provides controlled substance analysis for the 1st, 2nd, and 14th judicial circuits in Florida, covering 16 counties and a population of about 1.25 million.
- The lab averages about 400 cases per month.
- The lab has 3 full time analysts, 2 part time lab assistants, and a supervisor

FDLE - Pensacola

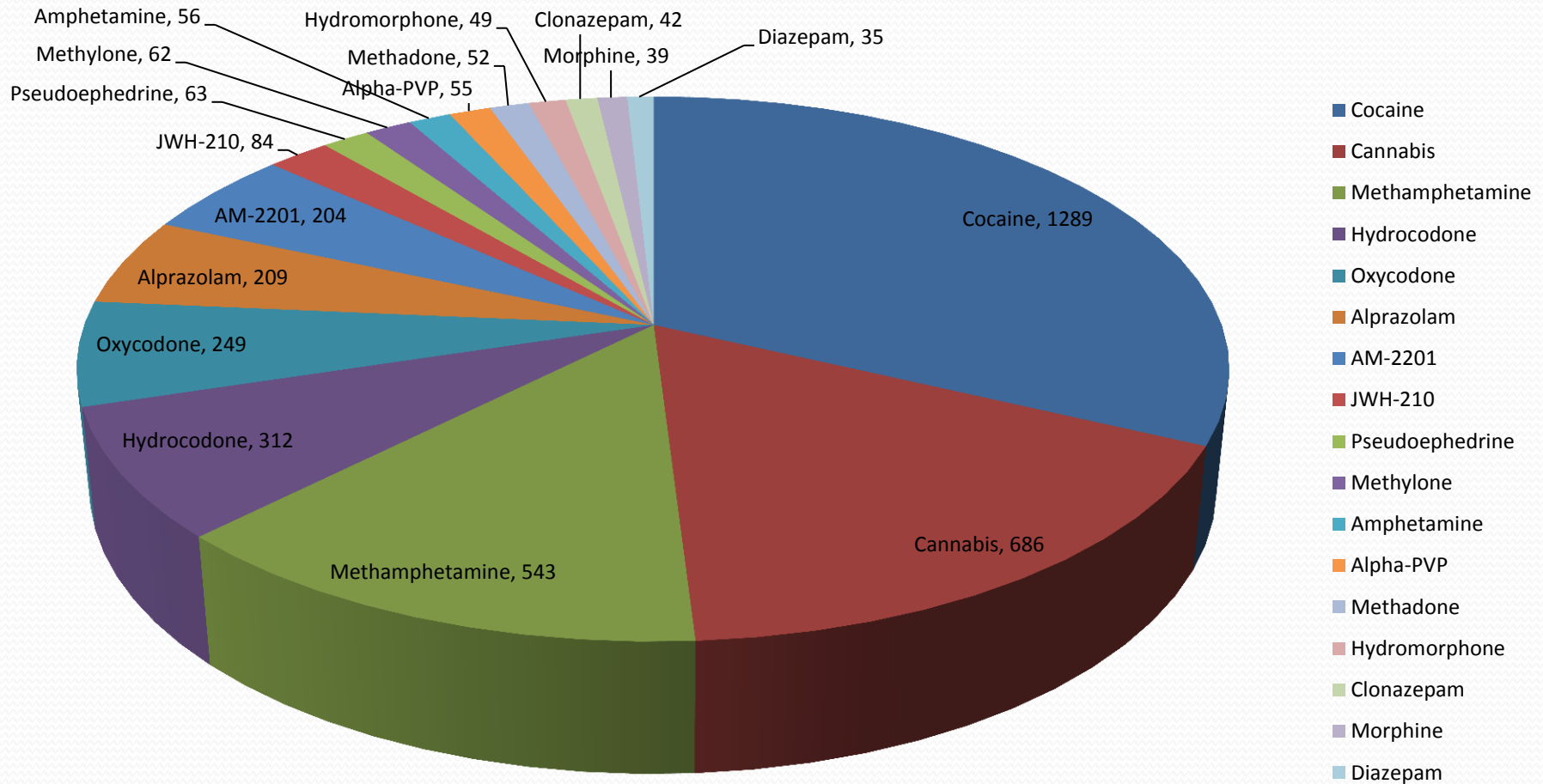


Our lab covers the northwest region (left of the blue line)

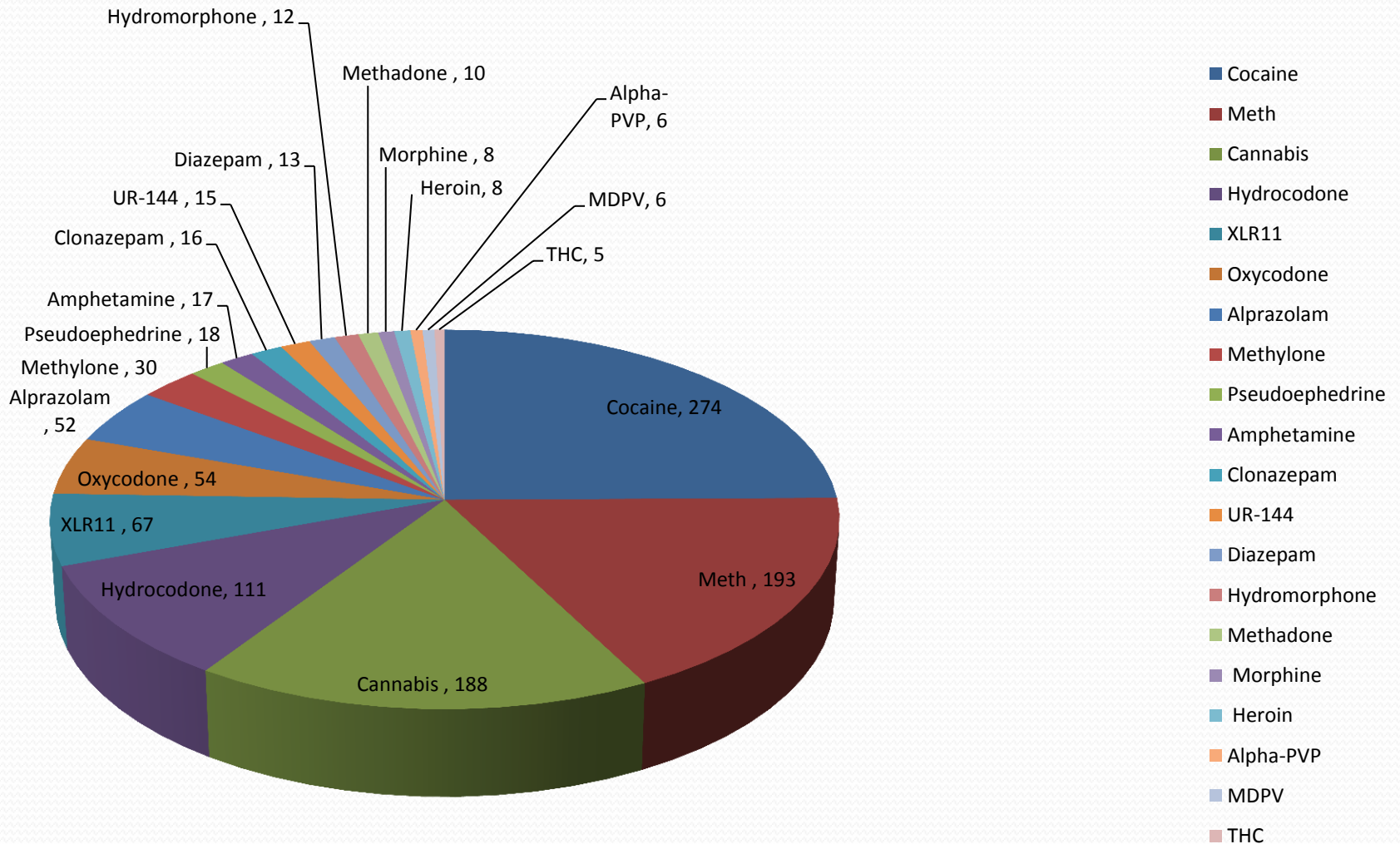
Top Drugs in our Region, 2011



Top Drugs in our Region, 2012



Top Drugs in our Region, 2013 to date



Designer Drugs, 2012 NW FL

- AM-2201 – 204 cases
- Methylone – 62 cases
- JWH-210 – 84 cases
- Alpha-PVP – 55 cases
- JWH-122 – 27 cases
- Pentedrone – 24 cases
- Pyrovalerone – 8 cases

Trends

- XLR11 & UR-144, both emergency controlled in December 2012, have moved to #4 and #12, respectively.
- AM-2201 & JWH-210, #7 and #8 last year, respectively, have dropped out of the top twenty. Both were controlled in March 2012. AM-2201 and JWH-210 were “replaced” by XLR11 and UR-144 after legislation.
- Methylone continues to climb. It was #10 last year, with 62 cases. It sits at #8 currently. 62 total last year, 30 already thru March.
- Heroin use on the rise – 0 cases in 2010, 11 in 2011, 21 in 2012, 8 through 3 months.
- PB-22 – 16 cases in 2013.

Florida Legislation - Timeline

- January 26, 2011 – The Florida Attorney General’s Office emergency scheduled six drugs that were commonly seen in “Bath Salt” samples in Florida. They were added to schedule I.
 - 3,4-Methylenedioxymethcathinone (Methylone)
 - 3,4-Methylenedioxypropylvalerone (MDPV)
 - 4-Methylmethcathinone (Mephedrone)
 - 3-Methoxymethcathinone (3-MMC)
 - 3-Fluoromethcathinone (3-FMC)
 - 4-Fluoromethcathinone (Flephedrone, 4-FMC)

Florida Legislation - Timeline

- July 1, 2011 – HB1039 made the following designer cathinones permanently controlled, schedule I, FS893:
 - 3,4-Methylenedioxyamphetaminone
 - Methylmethcathinone
 - Methylethcathinone
 - Methoxymethcathinone
 - Fluoromethcathinone
 - 3,4-Methylenedioxypropylamphetaminone (MDPV)
- Differences from emergency control legislation: Addition of Methylethcathinone (MEC); Removal of isomer designations on some; Removal of common names, with the exception of MDPV

Florida Legislation - Timeline

- July 1, 2011 – SB204/HB 39 Made the following synthetic cannabinoid compounds illegal, schedule I, FS893:
 - CP47,497
 - C8 homologue of CP47,497
 - HU-210
 - JWH-018
 - JWH-073
 - JWH-200
- Plant material coated with synthetic cannabinoids have reduced penalties if under 3 grams (misdemeanor). Automatic felony at any weight if in powder form.

Florida Legislation - Timeline

- March 23, 2012 – HB1175 added approx. 90 new drugs to FS893, schedule I. These include many synthetic cannabinoids, designer cathinones, and novel hallucinogens.
- Included: BZP, FPP, MPP, CPP, 12 Tryptamines, DOI, DOC, 2C-E, 2C-C, 2C-I, Butylone, Ethylone, Naphyrone, Buphedrone, 3,4-Dimethylmethcathinone, Pentylone, MDPBP, BTCP, alpha-PVP, PPP, and PBP, MPPP, 16 JWH compounds, CB-13, 25, and 52, AM-2201, AM-694, RCS-4 and 8

Florida Legislation - Timeline

- December 11, 2012 - The Florida Attorney General's Office emergency scheduled 22 new chemicals:
 - Pentedrone, Fluoroamphetamine, Fluoromethamphetamine, Methoxetamine, Methiopropamine, 4-Methylbuphedrone, APB, APDB, UR-144, XLR11, 5-Chloro-UR-144, AKB48, AM-2233, STS-135, URB-597, URB-602, URB-754, 2C-D, 2C-H, 2C-N, 2C-P, and 25I-NBOMe

Florida Legislation - Timeline

- Pending bills: S294 and H619 – Controlled Substances. They include the permanent addition of the emergency scheduled drugs from 12/11/12 to schedule I of FS893.
- Also adds PB-22, 5-Fluoro PB-22, BB-22, and 5-Fluoro AKB48
- Unanimously passed House and Senate; awaiting Governor's signature

Drug Generations - Florida

- 1st generation bath salts began in mid to late 2010 and ended shortly after the emergency rule.
 - 1st generation bath salts: Mephedrone, Methyldone, MDPV. Methyldone, however, has not disappeared. It is our 8th most popular drug in our region, even after being added to schedule I. “Molly” is the slang term. Generally seen in capsule form.
- 1st generation synthetic cannabinoids: JWH-018, JWH-073, JWH-200. These are long gone.

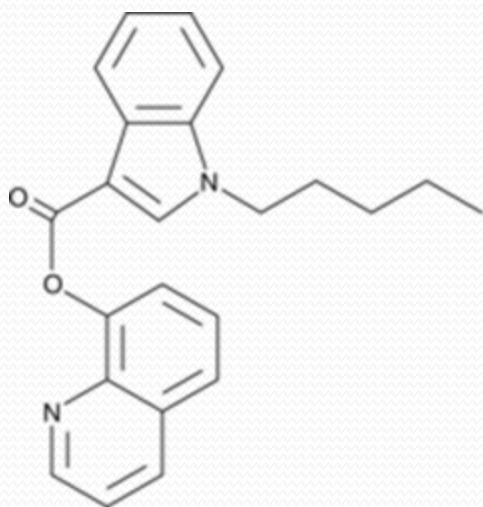
Drug Generations - Florida

- 2nd generation bath salts emerged after the July 1, 2011 legislation, and ended in March 2012 (with the next legislation). They include Naphyrone, Buphedrone, alpha-PVP, Pentylone, Pentedrone, MPPP
- 2nd generation synthetic cannabinoids, same time frame: JWH-250, AM-2201, JWH-210, JWH-122, JWH-081, JWH-203

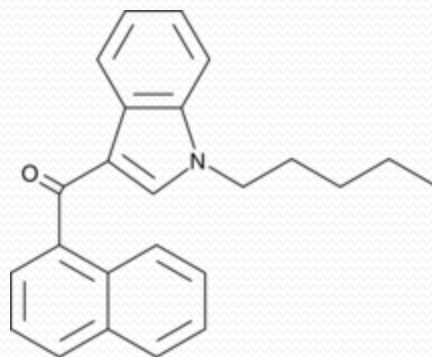
Drug Generations - Florida

- 3rd generation synthetic cannabinoids (after March 23, 2012, ending with emergency schedule 12/11/12): UR-144, XLR-11; to a lesser extent, AKB48 and STS-135
- 3rd generation bath salts: Pentedrone, Fluoroamphetamine
- 4th generation (current) synthetic cannabinoids: PB-22 and 5-Fluoro AKB48
- No 4th generation bath salts. Major dip in seizures/submissions after mid-2012. However, Methylone has moved in to the illicit drug market as “Molly”

PB-22



$C_{23}H_{22}N_2O_2$, MW 358
PB-22 is a potential analog of JWH-018
(8-hydroxyquinoline replacing
naphthalene group)



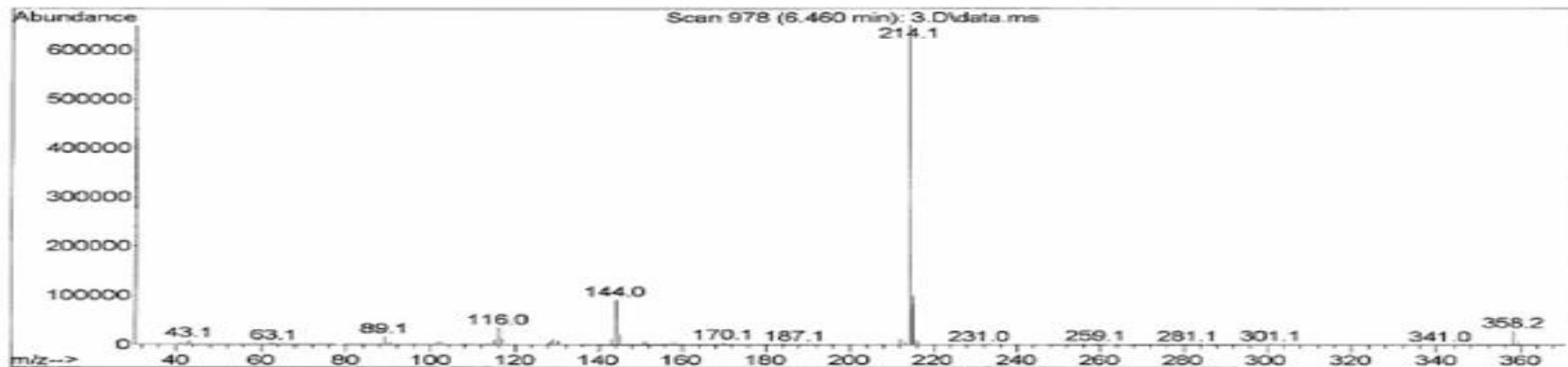
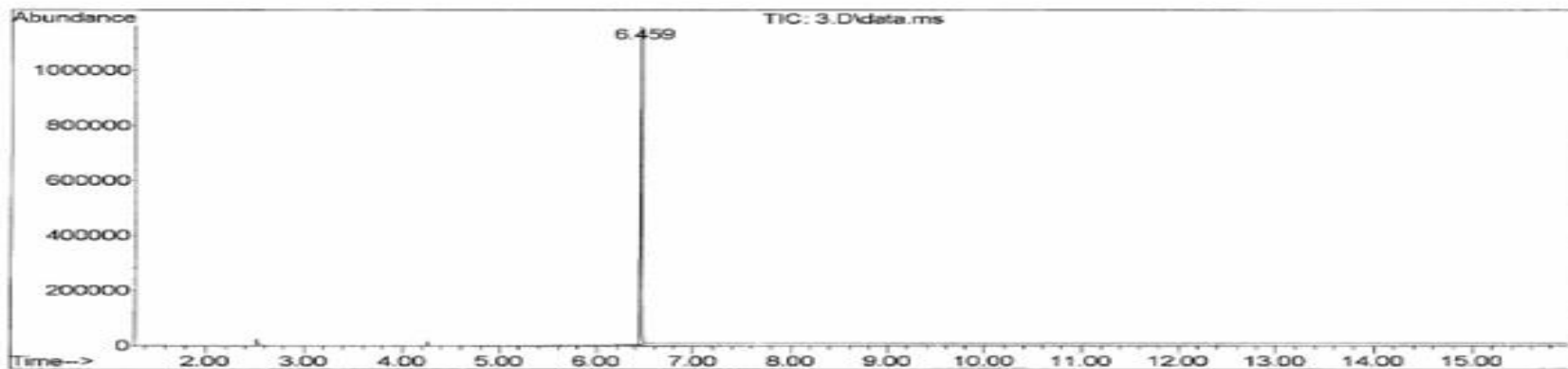
JWH-018

PB-22 Storage

- Store cold (at least -20C)
- PB-22 is an ester and not stable in alcohols
- Transesterification will cause major degradation peaks on GC/MS if you store in alcohol
- Try acetonitrile as the solvent

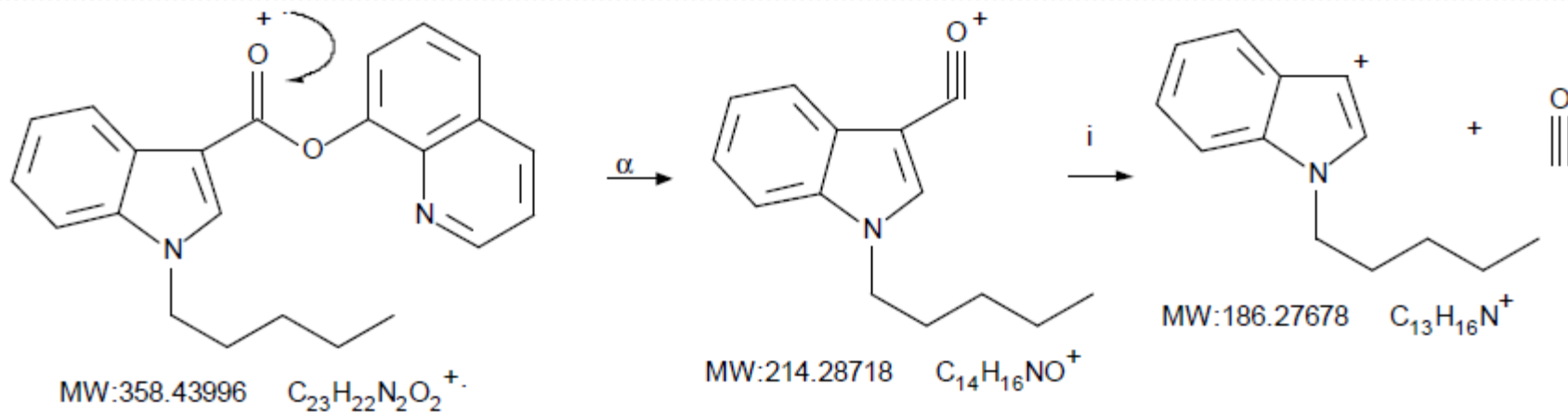
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Operator:
Date Acquired: 4 Mar 2013 16:20
Instrument: Agilent 6890N 5973MSD GCMS#3
Method File: SPICE.M
Sample Name: PB-22 7328AA
Misc Info:
Vial Number : 3

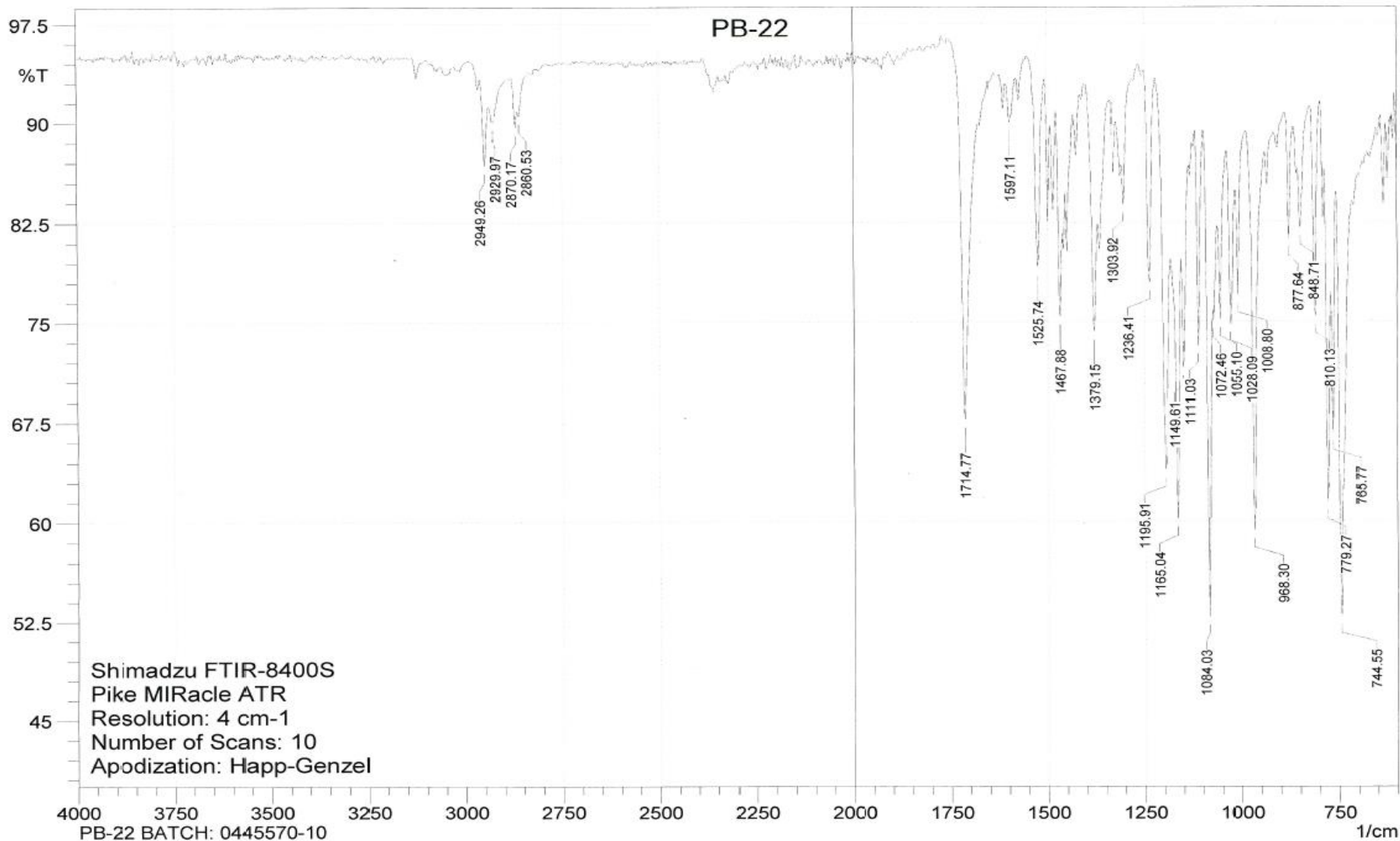
Instrument Parameters:
RTX-1MS 15m, 0.25mm Internal Diameter, 0.25um Film Thickness
100% Dimethyl Polysiloxane
Carrier Gas: Helium, Flow: 1mL/min
Inlet Temperature: 265C 40:1 split
Transfer Line Temperature: 280C
Oven Program: 80C for 1.5 minutes, ramp to 310C at 50C/min,
Hold at 310C for 9.9 minutes



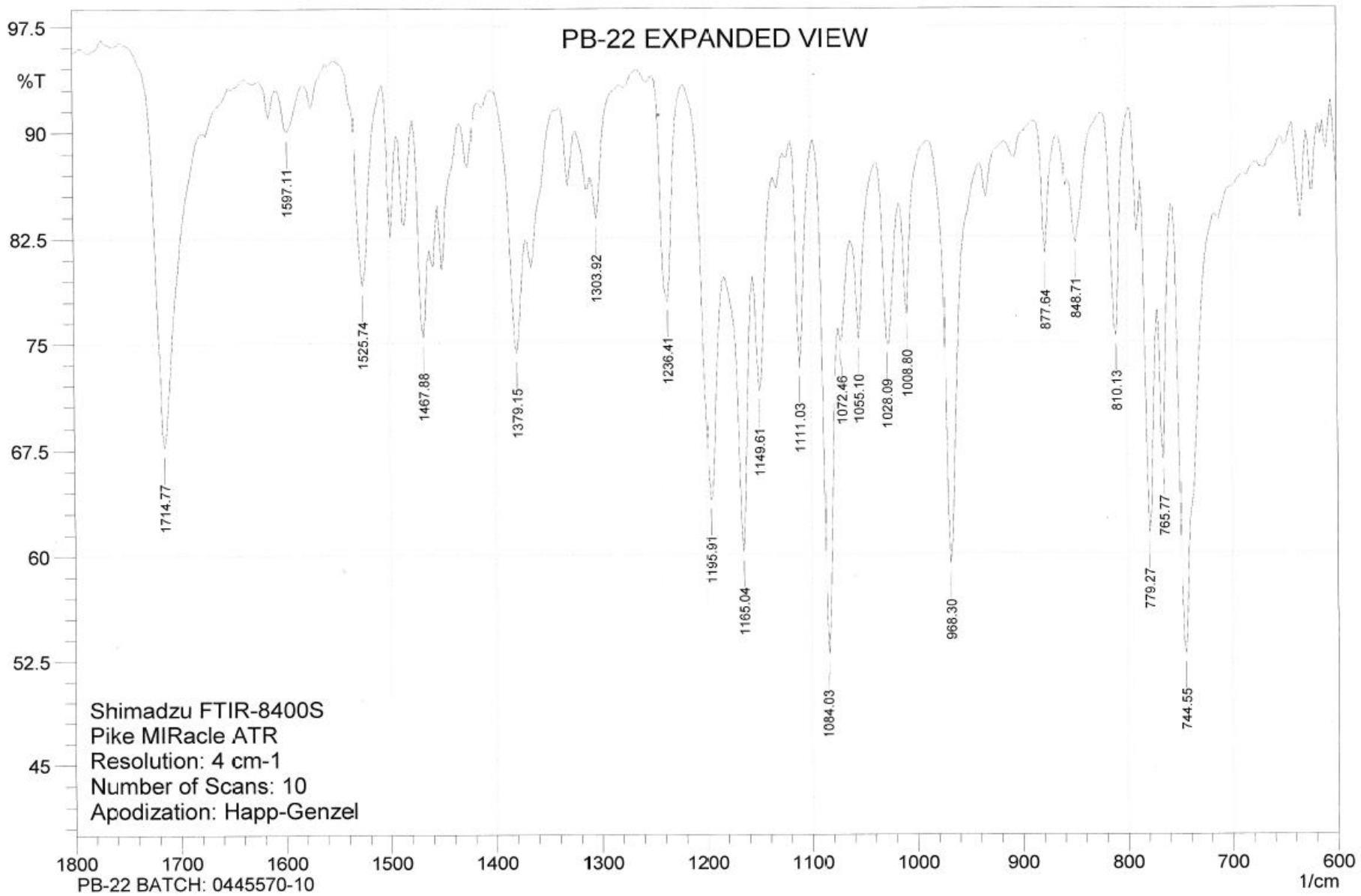
PB-22

- Mass Spectrum is dominated by the product of an alpha-cleavage at the right of the oxo-group at nominal m/z 214





PB-22 EXPANDED VIEW

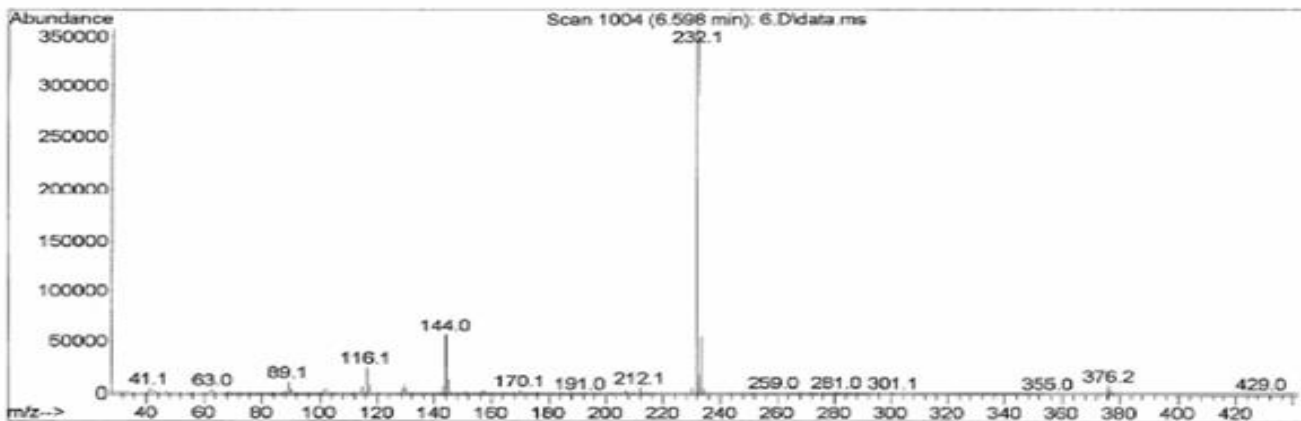
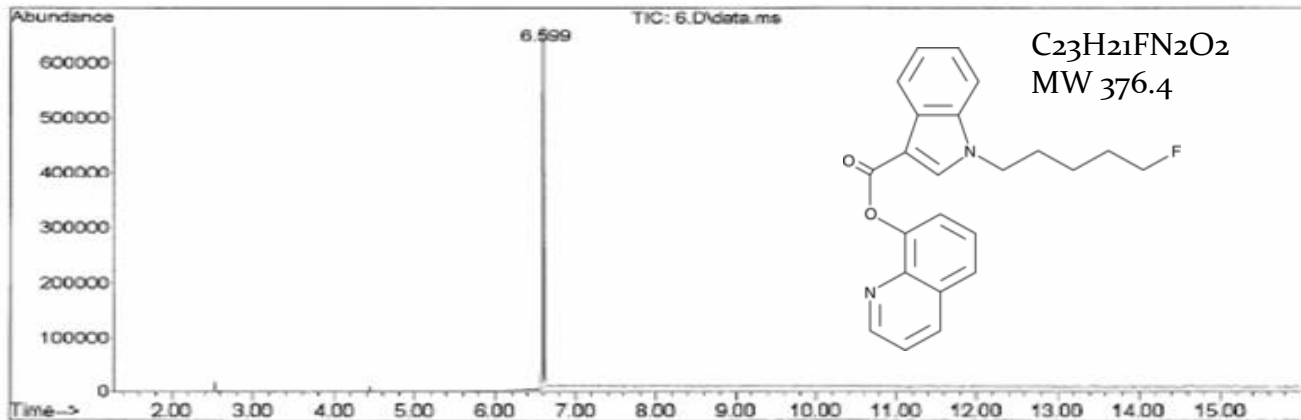


Shimadzu FTIR-8400S
Pike MIRacle ATR
Resolution: 4 cm-1
Number of Scans: 10
Apodization: Happ-Genzel

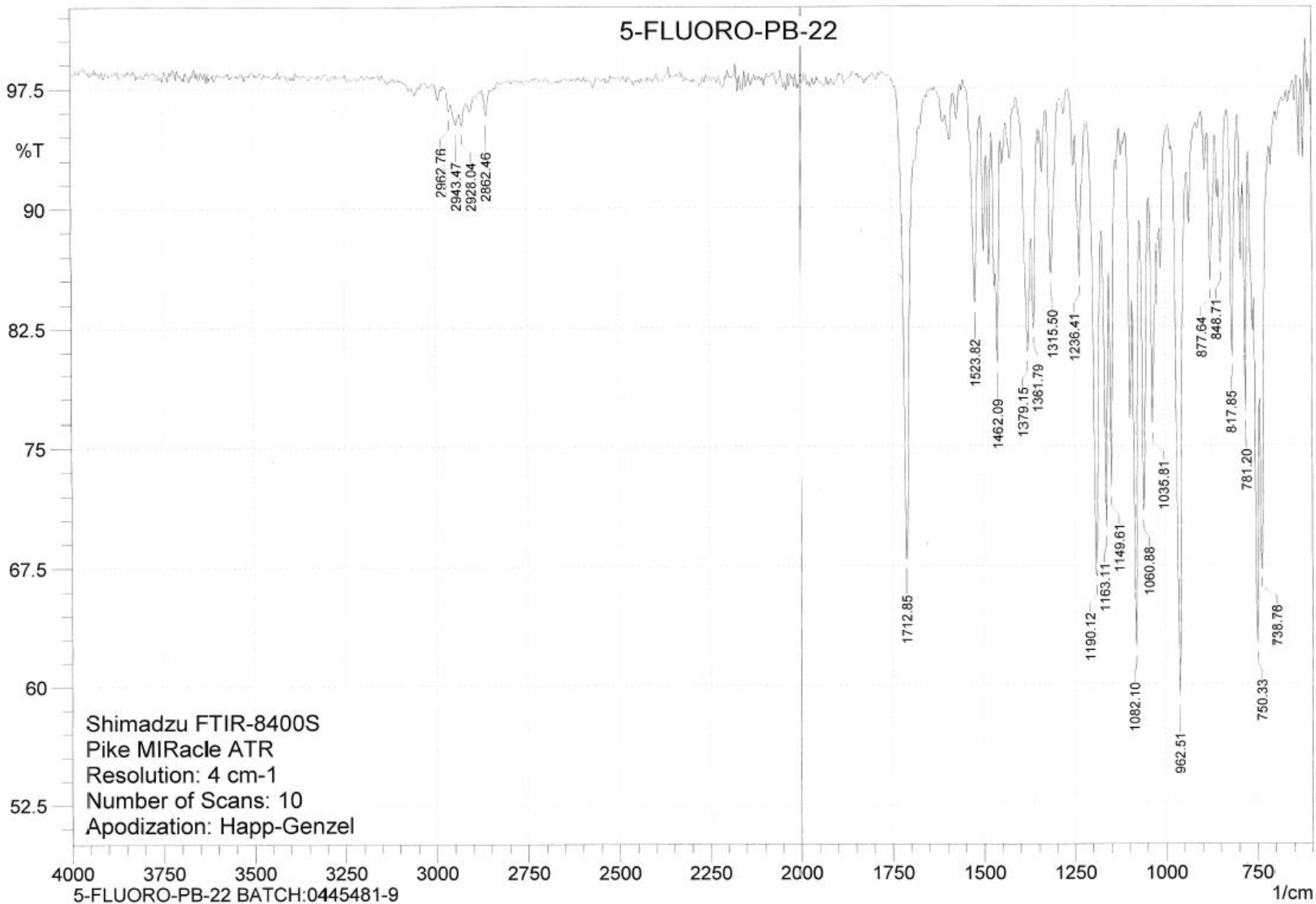
PB-22 BATCH: 0445570-10

File: D:\MCD\SPICE1\6.D
Operator:
Date Acquired: 4 Mar 2013 17:24
Instrument: Agilent 6890N 5973MSD GCMS#3
Method File: SPICE.M
Sample Name: 5-FLUORO-PB-22 7329AA
Misc Info:
Vial Number : 5

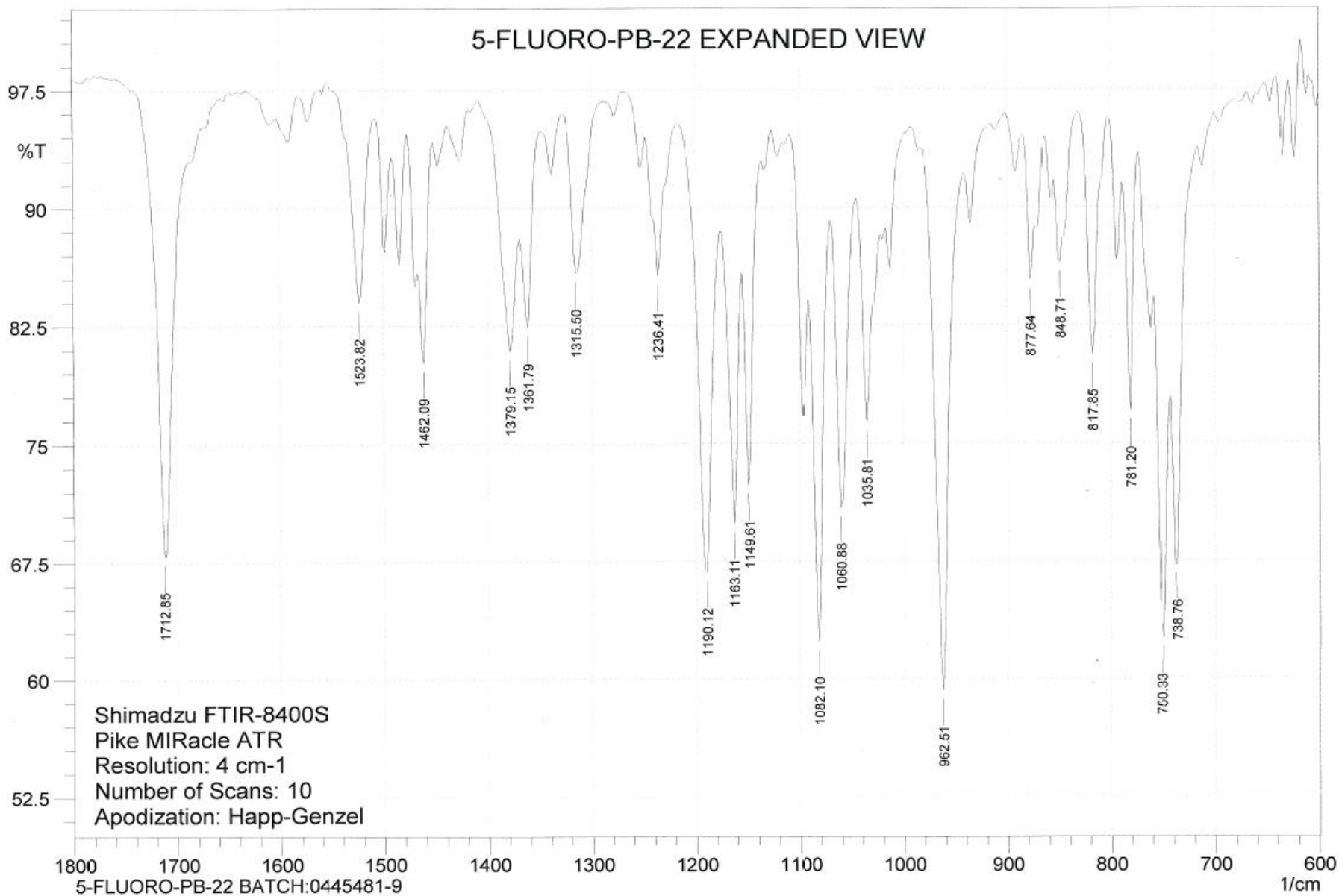
Instrument Parameters:
RTX-1MS 15m, 0.25mm Internal Diameter, 0.25um Film Thickness
100% Dimethyl Polysiloxane
Carrier Gas: Helium, Flow: 1mL/min
Inlet Temperature: 265C 40:1 split
Transfer Line Temperature: 280C
Oven Program: 80C for 1.5 minutes, ramp to 310C at 50C/min,
Hold at 310C for 9.9 minutes



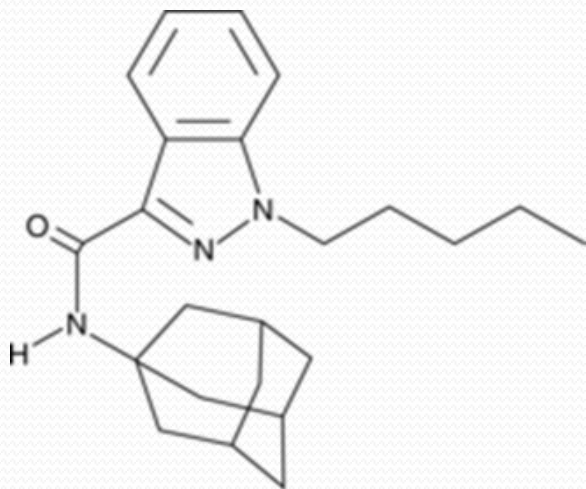
5-FLUORO-PB-22



5-FLUORO-PB-22 EXPANDED VIEW



AKB-48 / 5-Fluoro AKB-48



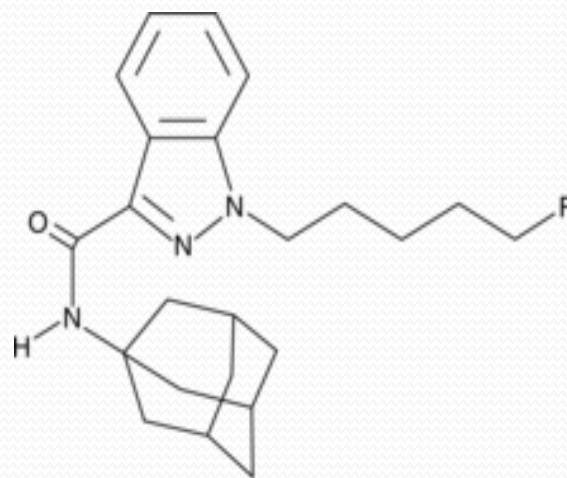
AKB48

$C_{23}H_{31}N_3O$

MW 365

Emergency controlled in FL,

12/11/12



5-Fluoro AKB48

$C_{23}H_{30}FN_3O$

MW 383

LEGAL

AKB48 Mass Spectrum

AKB48

N-Adamantyl-1-pentylindazole-3-carboxamide

Texas Department of Public Safety, R. A. Rendon

Cannabimimetic

MW:365.51876

MM:365.24671

$C_{23}H_{31}N_3O$

CAS:1345973-53-6

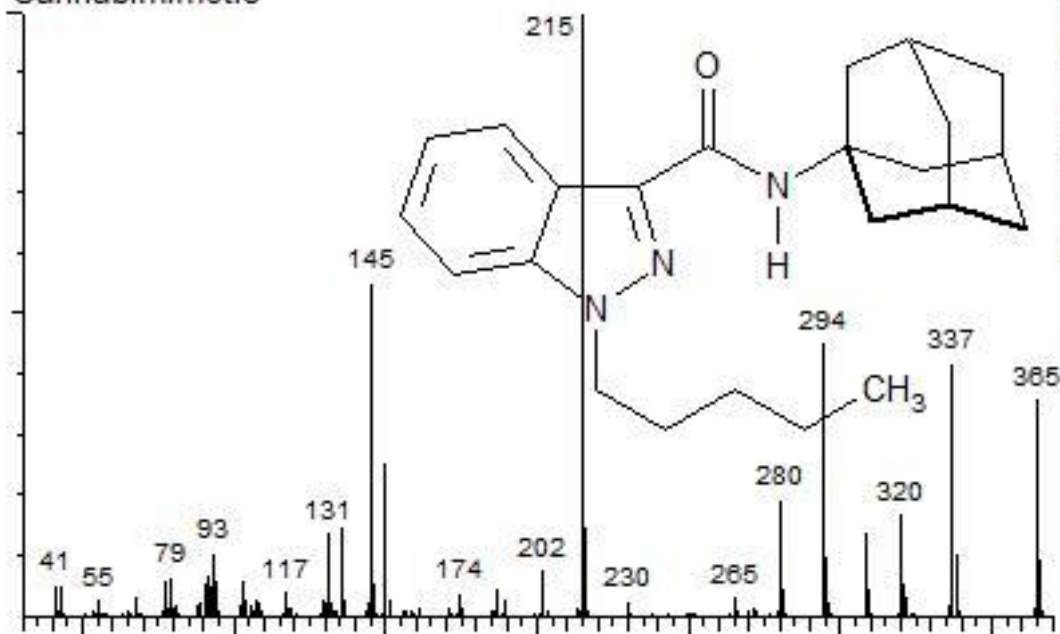
RI: 3033 (calc.)

GC/MS

EI 70 eV

TSQ 700

QI:967



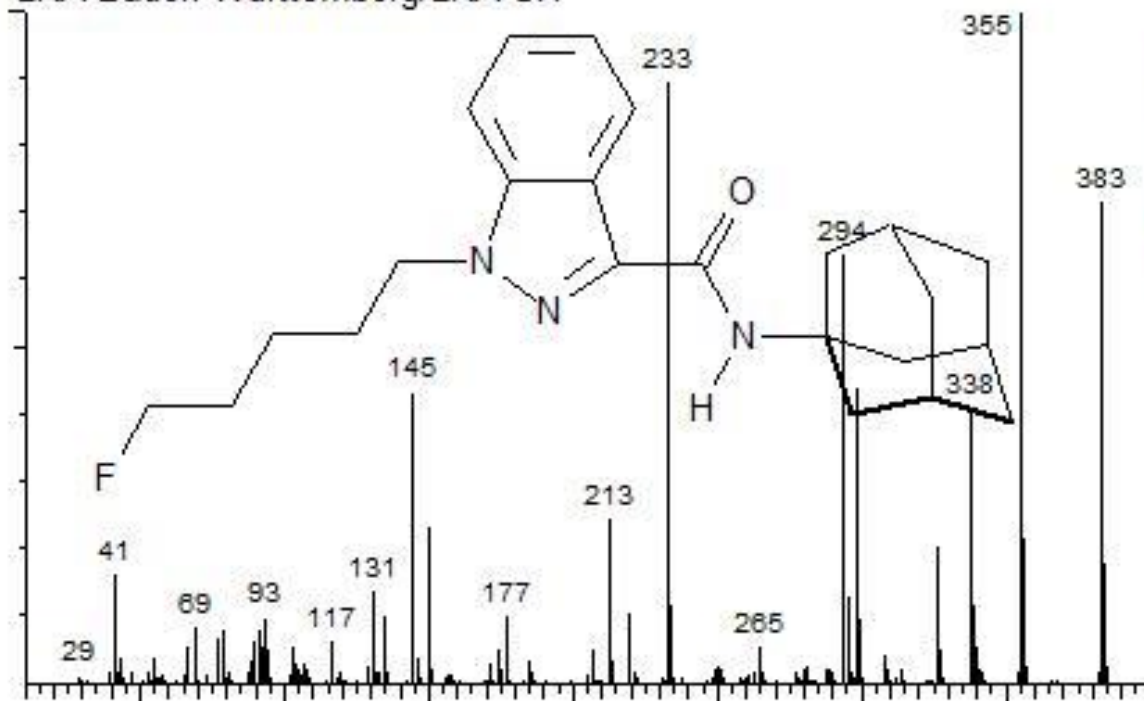
COURTESY ROSNER / TDPS

5-Fluoro AKB48 Mass Spectrum

N-(1-Adamantyl)-1-(5-fluoropentyl)indazole-3-carboxamide
5F-AKB48, 5F-APINACA
LKA Baden-Württemberg/LKA SH

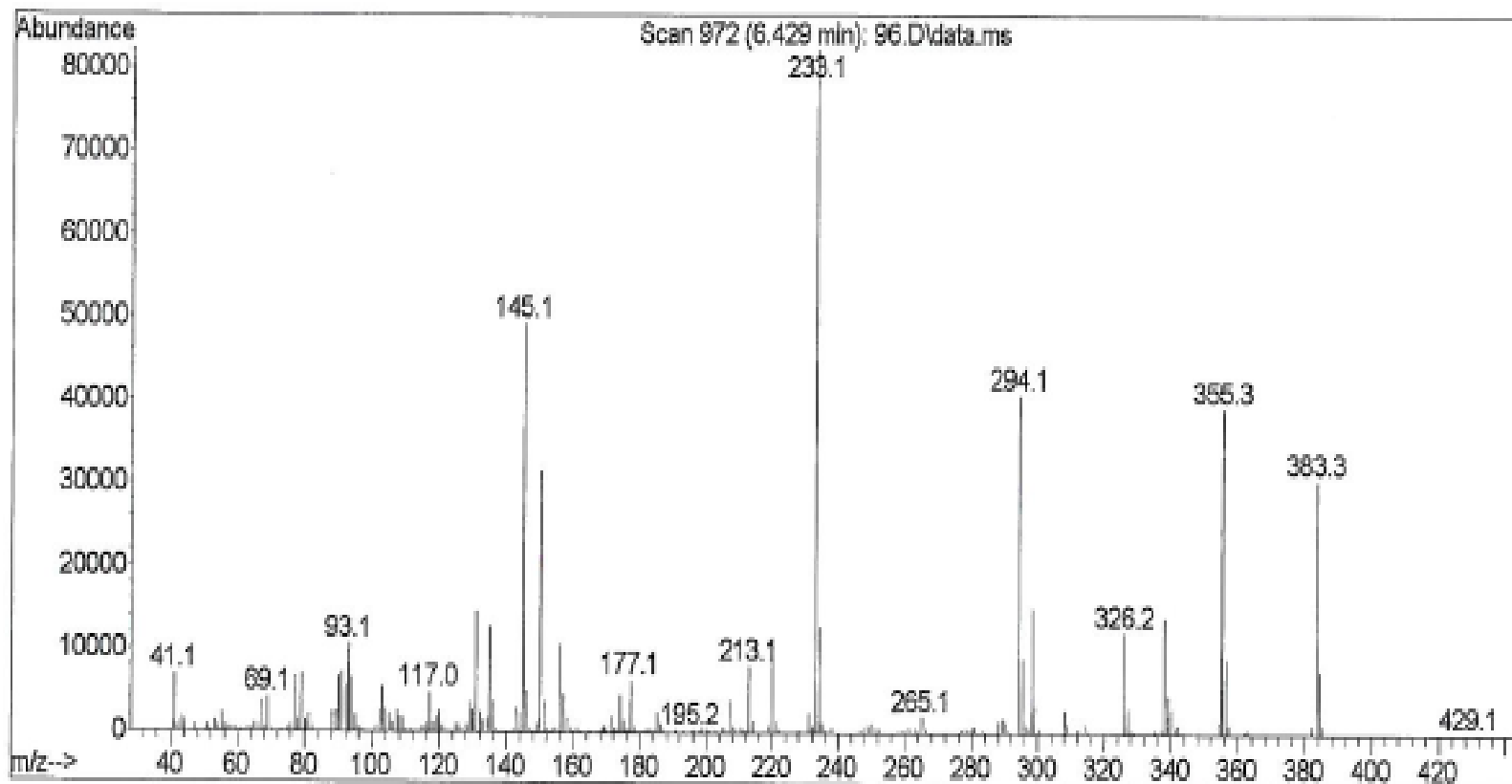
MW: 383.50922
MM: 383.23729
C₂₃H₃₀FN₃O
RI: 3252 (DB-1)

GC/MS
EI 70 eV
TSQ 7000
QI: 995



COURTESY ROSNER

5-Fluoro AKB48 Mass Spectrum (standard purchased from Cayman Chemicals)



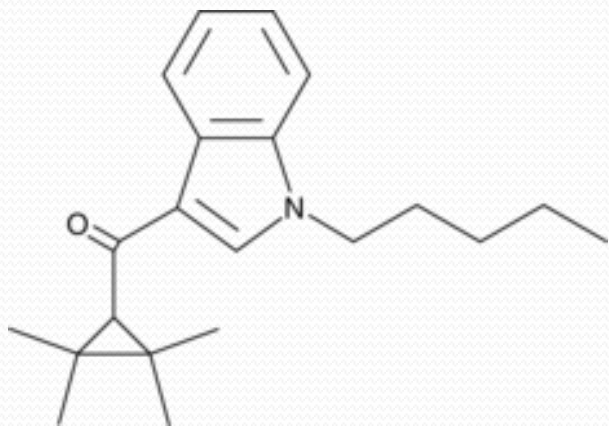
Where Do These Names Originate?

AKB48 – Japanese girl band



STS-135 – Final mission
of the American Space
Shuttle Program

UR-144 / XLR11

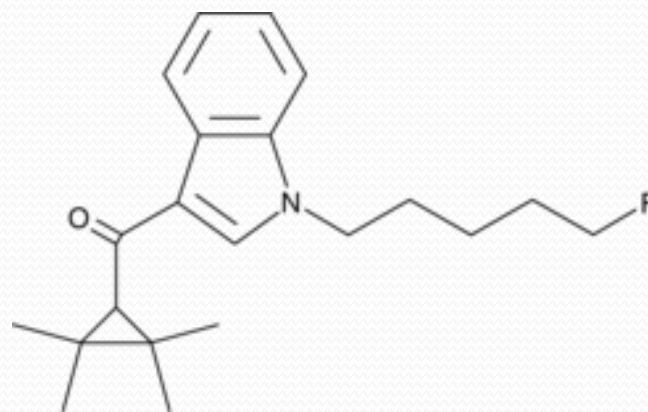


UR-144

C₂₁H₂₉NO

MW 311

Emergency Controlled in FL,
12/11/12



XLR11

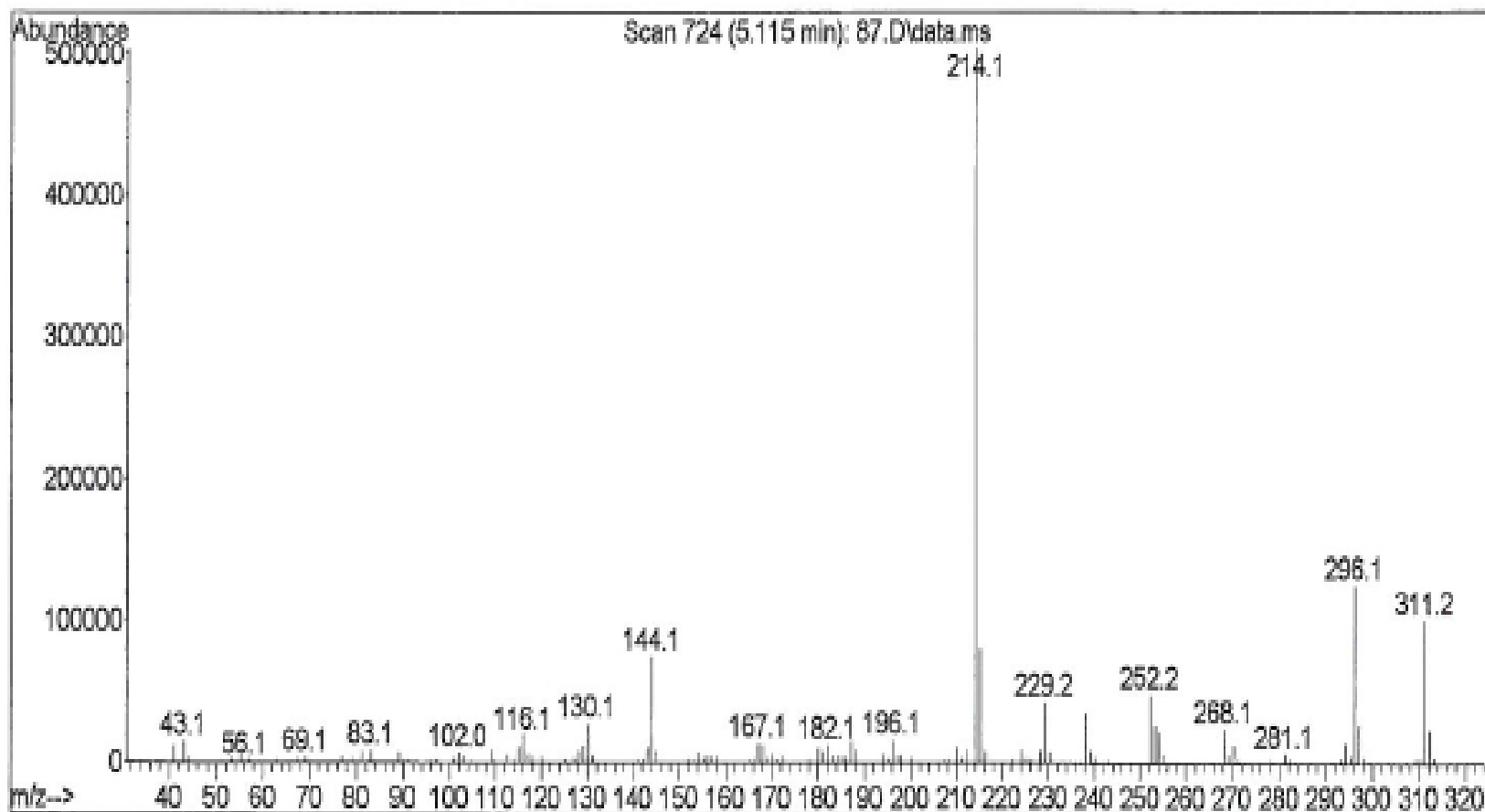
AKA 5-Fluoro UR-144

C₂₁H₂₈FNO

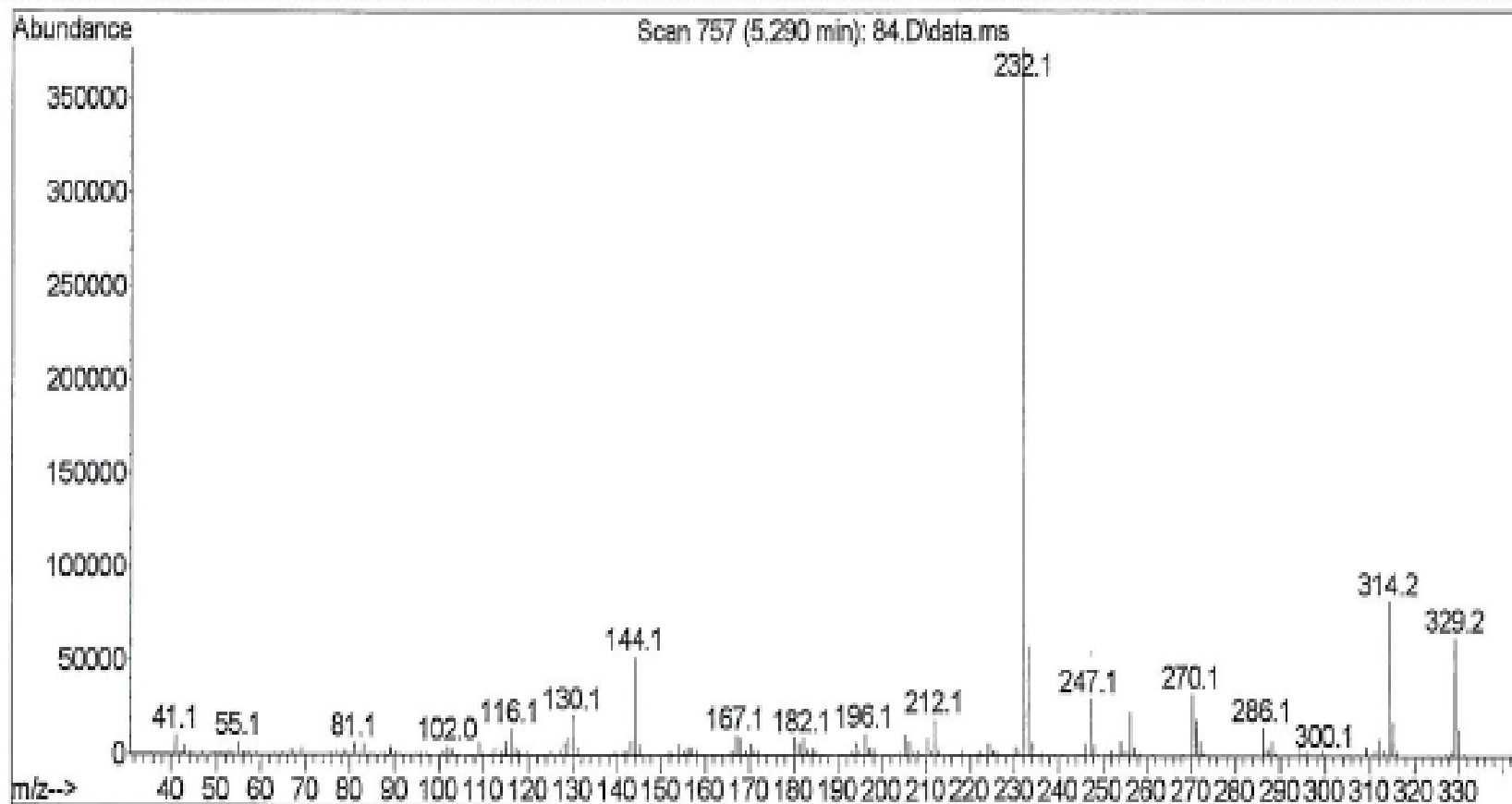
MW 329

Emergency Controlled in FL,
12/11/12

UR-144 Mass Spectrum (Purchased from Cayman Chemicals)



XLR11 Mass Spectrum (Purchased from Cayman Chemicals)



Samples in the lab



Positive for
Butylone

Samples in the lab



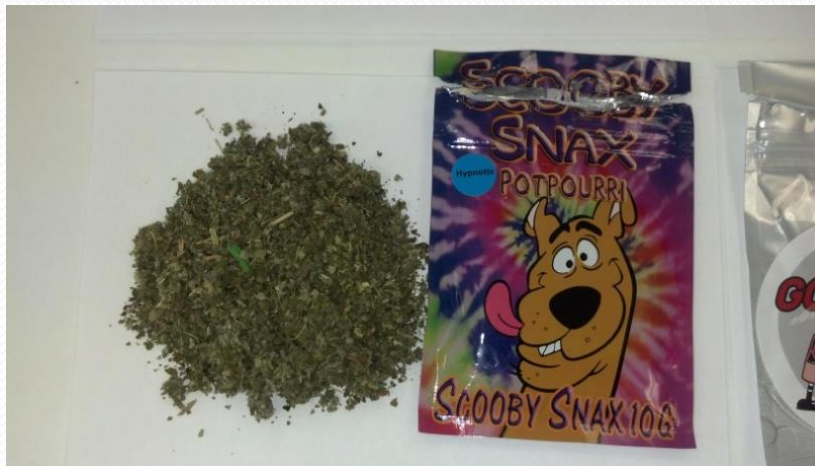
Positive for JWH-210

Samples in the lab



Positive for AM-
2201

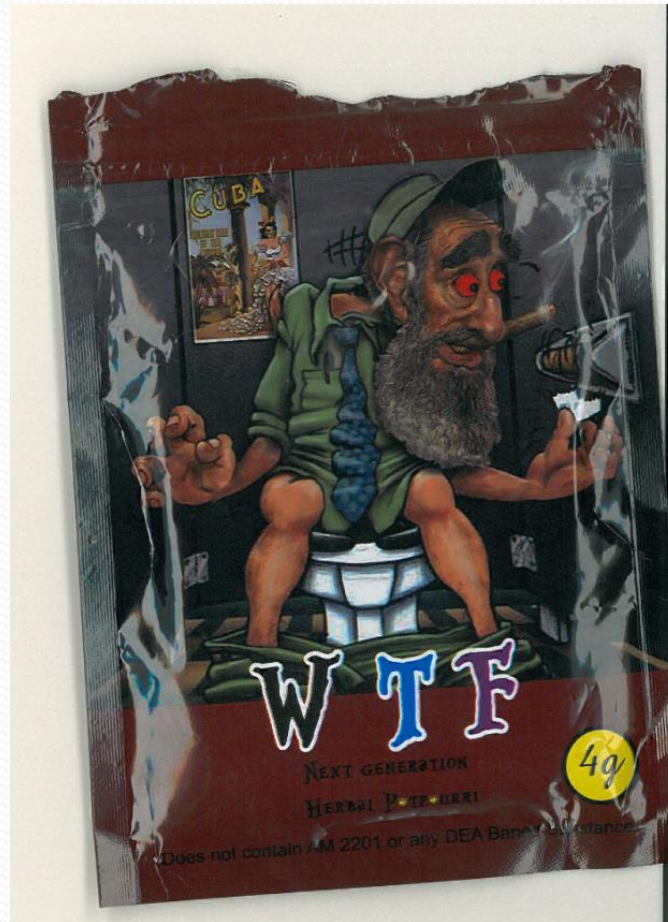
Samples in the Lab



Both Positive for AM-2201 and JWH-210



Samples in the lab



Positive for XLR11

Samples in the lab



T20 High Quality damiana not for human consumption.
Legal under New FL Law HB/1175 (eff. 3/23/12) Potpourri

Popular Brands

- Most popular brands seen in the lab:
 - WTF: Next Generation
 - Dead Man Walking
 - Super POW
 - Scooby Snax
 - OMG
 - Master Kush
 - Forget-Me-Not
 - Bird of Paradise
 - Mad Hatter
 - Lick Me All Over
 - Down2Earth ClimaXXX and Reggie

Popular Brands



Popular Brands



Popular Brands



N-Ethylbuphedrone (NEB)



4-Fluoroamphetamine

Preparation tips

- Build libraries – buy standards and add them to your internal GC/MS libraries. Use free libraries like Cayman and SWGDRUG. Buy Mass Spectra of Designer Drugs by Rosner.
- Stay active – become a member of CLIC (they have an active Yahoo! Group). Use Forendex and Forendex Forums.
- Build an internal drug repository to store articles and data for easy search and retrieval.
- Read as many articles as you can get your hands on.

Websites for Spectra Searching

Designer Drugs (Rosner website):

<https://db12.designer-drugs.de/db/main.pl>

Forendex Forum:

<http://forendexforum.southernforensic.org/>

Forendex:

<http://forendex.southernforensic.org/index.php/home/index>

Drug Standards

<https://www.caymanchem.com>

<http://www.cerilliant.com>

<http://www.lipomed.com>

<http://www.sigmaaldrich.com>

<http://www.steraloids.com>

<http://www.trc-canada.com>

<http://www.discoverysciences.com>

<http://www.usp.org/products>

Analytical issues

- To reduce analytical issues, we try to name compounds in the statutes without isomer designations, and specify that all isomers are controlled. For instance, “Fluoroamphetamine” is controlled, all isomers. So instead of having to differentiate between the 2, 3, and 4, we just obtain a MS, and compare retention time against any of the 3 isomers. If it matches, we report out Fluoroamphetamine. This cuts down on standards needing purchasing; analytical procedures to differentiate; and reporting clearly and unambiguously.

Analytical issues

- Those that get added in statute with isomer designation (like TFMPP) are compared with the 3-TFMPP and a remark is placed on the report that “Specific isomer not determined”

How we report drugs

- If a controlled substance: *Name of substance.*
- If it is emergency scheduled, we add a comment under the remarks section that: **** was emergency controlled in the state of Florida December 11, 2012.*
- If it's a potential analog: ****, which is substantially similar to ***.*
- If we do not identify the specific isomer in statute, we add a remark that: *Specific isomer not determined.*

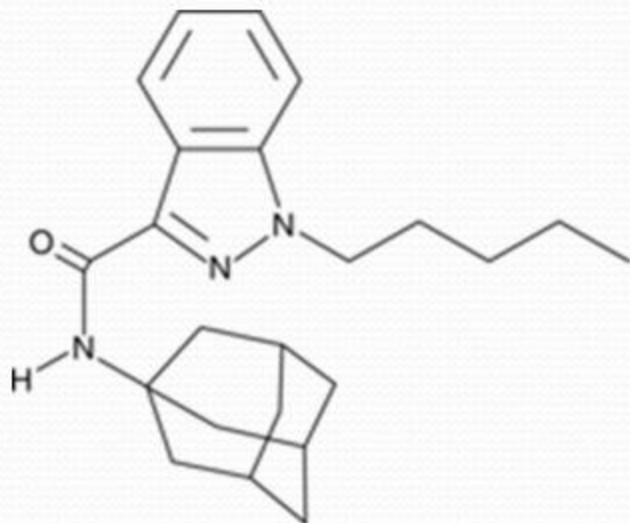
Analogs

- (2)(a) As used in this section, “controlled substance analog” means a substance which, due to its chemical structure and potential for abuse, meets the following criteria:
 1. Is substantially similar to that of a controlled substance listed in Schedule I or Schedule II of s. 893.03; and
 2. Has a stimulant, depressant, or hallucinogenic effect on the central nervous system or is represented or intended to have a stimulant, depressant, or hallucinogenic effect on the central nervous system substantially similar to or greater than that of a controlled substance listed in Schedule I or Schedule II of s. 893.03.

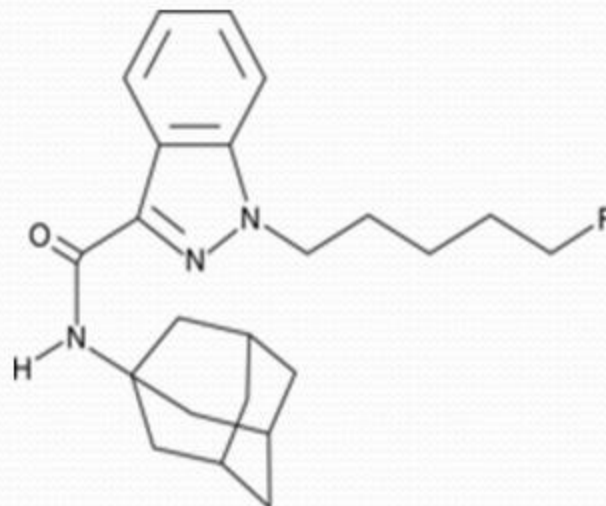
Analogs

- We only deal with prong 1 – whether it is substantially similar in chemical structure. We have a generally accepted practice in Pensacola for how to approach and determine potentially “substantially similar” compounds.

AKB48 vs 5-Fluoro AKB48



AKB48
C₂₃H₃₁N₃O
MW 365
Emergency controlled in FL,
12/11/12



5-Fluoro AKB48
C₂₃H₃₀FN₃O
MW 383
LEGAL

5-Fluoro AKB48, which is substantially similar to AKB48.

Thank you!!!

Joseph Graves

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