

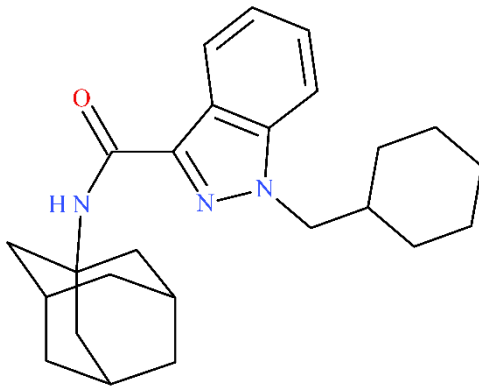
Trend Report: Q3 2019

Synthetic Cannabinoids in the United States

New Synthetic Cannabinoids Identified in Q3 2019

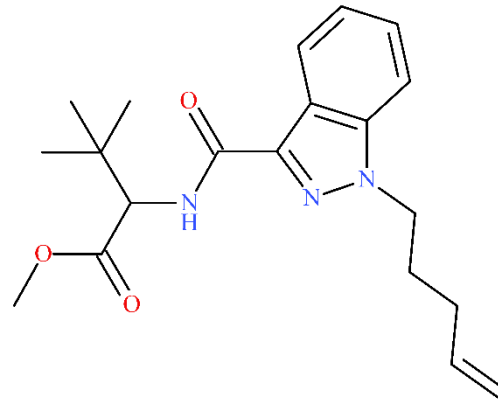
ACHMINACA

First Identification: July 2019

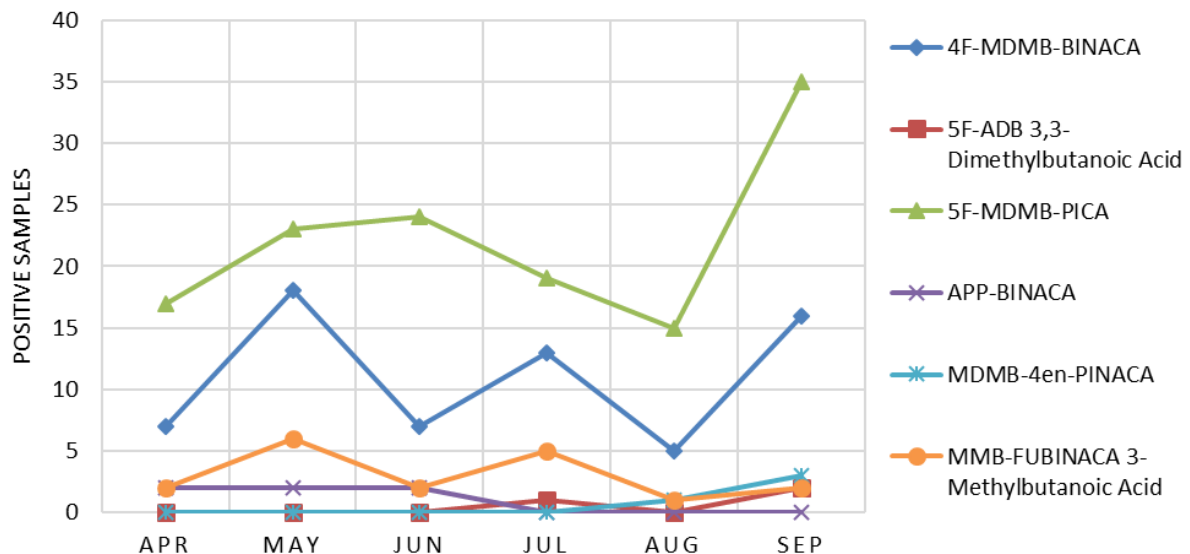


MDMB-4en-PINACA

First Identification: August 2019



Synthetic Cannabinoid Positivity: April to September 2019 (by Month Analyzed)



Purpose

The objective of this report is to provide up-to-date information regarding the status of synthetic cannabinoid prevalence, positivity, and discovery within the United States.

Project Overview

Novel psychoactive substances (NPS), including synthetic cannabinoids, continue to provide great challenges for forensic scientists, clinicians, and public health and safety personnel. Synthetic cannabinoids have been implicated in an increasing number of emergency room admissions, death investigations, and intoxication events in corrections populations. Maintaining a current scope of analysis can be challenging, often requiring availability of comprehensive analytical methodologies and reference materials for identifications.

This project employs a novel approach to analysis of biological samples and extracts by comprehensive non-targeted data acquisition using liquid chromatography high resolution quadrupole time-of-flight mass spectrometry (LC-QTOF). The scope of analysis contains more than 250 synthetic cannabinoid parent compounds and metabolites. Sample analysis and data processing occur on a weekly basis. In addition, retrospective analysis of datafiles is conducted as new synthetic cannabinoid standards become available. This model allows for real-time identification of novel synthetic cannabinoids and trend analyses.

Our laboratory has paired with various institutions to identify at-risk populations associated with synthetic cannabinoid use. Biological samples have been received from forensic laboratories, clinical partnerships, and/or correctional facilities from individuals involved in death investigations, driving under the influence scenarios, hospitalizations, and/or intoxications.

In collaboration with NMS Labs, sample extracts were received during this reporting period from forensic casework where for cause testing was directed for synthetic cannabinoids using a regularly updated panel. In total, cases were submitted from 32 states and the District of Columbia.

Acknowledgements

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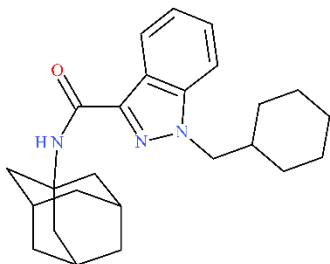
Disclaimer

All positive identifications were made based on extensive review of analytical data in comparison to acquired reference materials. Identifications of all chemically similar isobaric species may not have been achieved; therefore, reported analytes could encompass additional species not distinguishable solely by chromatographic or mass spectral features.

New Synthetic Cannabinoids

From July to September 2019, two new synthetic cannabinoids were identified in biological sample extracts; compound that were not incorporated into the previous scope of testing. These two new synthetic cannabinoids were reported during this project for the first time in forensic toxicological analysis in the United States.

ACHMINACA



CHEMICAL INFORMATION

IUPAC Name: N-(1-adamantyl)-1-(cyclohexylmethyl)indazole-3-carboxamide
CFR: Not Scheduled (11/2019)
CAS#: Not Available
Synonyms: SGT-37, Adamantyl-CHMINACA

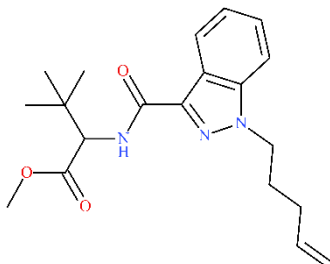
SAMPLE INFORMATION

Positive Cases: 1
First Collection: 6/26/2019
First Received: 7/2/2019
Locations: TX (n=1)

REFERENCES

NPS Discovery: [Adamantyl-CHMINACA Monograph](#)
 SWGDRUG: [ACHMINACA Monograph](#)

MDMB-4en-PINACA



CHEMICAL INFORMATION

IUPAC Name: Methyl 3,3-dimethyl-2-[(1-pent-4-enylindazole-3-carbonyl)amino]butanoate
CFR: Not Scheduled (11/2019)
CAS#: Not Available
Synonyms: MDMB-PENINACA, MDMB-PINACA N1-pentyl-4-en isomer, 5-CL-ADB-A

SAMPLE INFORMATION

Positive Cases: 6
First Collection: 5/16/2019
First Received: 5/21/2019
Locations: IN (n=2), UT (n=2), TX (n=1), and OH (n=1)

REFERENCE

[MDMB-4en-PINACA Monograph](#)

Trend Analysis for Synthetic Cannabinoids

From July to September 2019, seven synthetic cannabinoid parent compounds and nine synthetic cannabinoid metabolites were positively identified in 124 (9.6%) biological specimens or sample extracts after the analysis of 1,293 total samples. 5F-MDMB-PICA (n=69) was detected in the highest frequency, followed by 4F-MDMB-BINACA (n=34), MDMB-4en-PINACA (n=4), and MMB-FUBINACA (n=4). Several samples were positive for more than one synthetic cannabinoid, including parent compounds and/or metabolites. The following tables and figures are based on data from July to September 2019, unless otherwise noted.

Table 1: Positive Findings for Synthetic Cannabinoids (Parent)

Analyte (Parent)	Positive Samples	Positivity (%)
5F-MDMB-PICA	69	5.3%
4F-MDMB-BINACA	34	2.6%
MDMB-4en-PINACA	4	0.3%
MMB-FUBINACA	4	0.3%
4-cyano CUMYL-BUTINACA	1	0.08%
ACHMINACA	1	0.08%
ADB-FUBINACA	1	0.08%

Table 2: Positive Findings for Synthetic Cannabinoids (Metabolites)

Analyte (Metabolite)	Positive Samples	Positivity (%)
5F-MDMB-PICA 3,3-Dimethylbutanoic Acid	32	2.5%
4F-MDMB-BINACA 3,3-Dimethylbutanoic Acid	22	1.7%
MMB-FUBINACA 3-Methylbutanoic Acid	8	0.6%
5F-ADB 3,3-Dimethylbutanoic Acid	3	0.2%
ADB-PINACA N-Pentanoic Acid	3	0.2%
MDMB-FUBICA 3,3-Dimethylbutanoic Acid	3	0.2%
5F-PB-22 3-Carboxyindole	2	0.2%
MDMB-4en-PINACA 3,3-Dimethylbutanoic Acid	2	0.2%
MDMB-FUBINACA 3,3-Dimethylbutanoic Acid	1	0.08%

Table 3: Synthetic Cannabinoid Combinations

Analyte Combinations	Positive Samples
4F-MDMB-BINACA + 5F-MDMB-PICA	19
5F-MDMB-PICA + MDMB-4en-PINACA	2
5F-MDMB-PICA + MMB-FUBINACA	2
5F-MDMB-PICA + MDMB-FUBICA	2
4F-MDMB-BINACA + 5F-MDMB-PICA + MMB-FUBINACA	2
4F-MDMB-BINACA + ADB-FUBINACA	1
4F-MDMB-BINACA + MDMB-4en-PINACA	1
5F-ADB + MDMB-FUBICA	1
4F-MDMB-BINACA + ACHMINACA	1

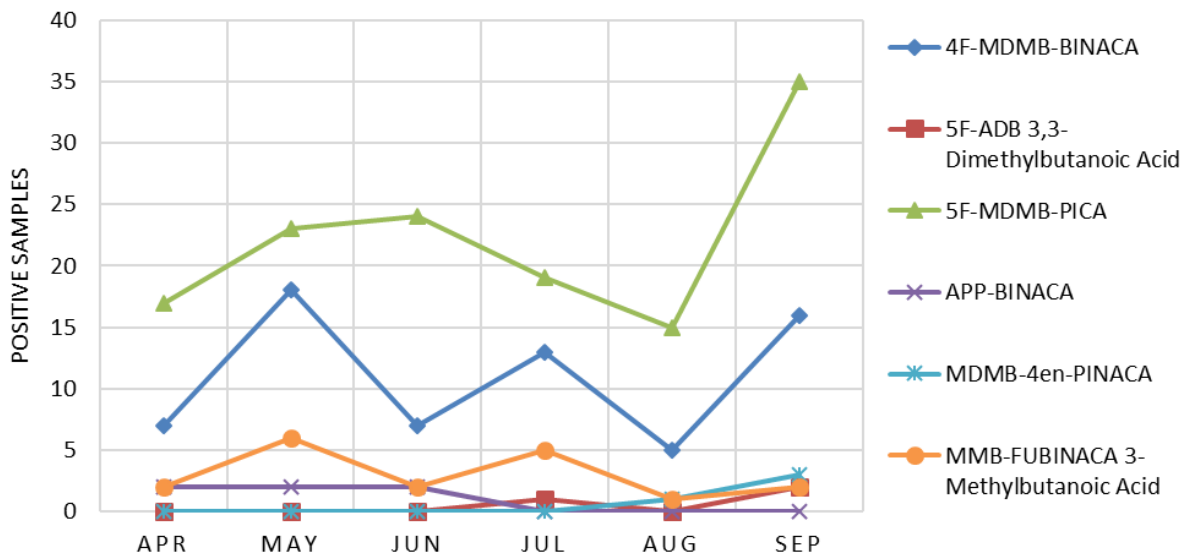


Figure 1: Synthetic Cannabinoids Positivity Trend Plot
 (Plotted by Month Analyzed; April to September 2019)

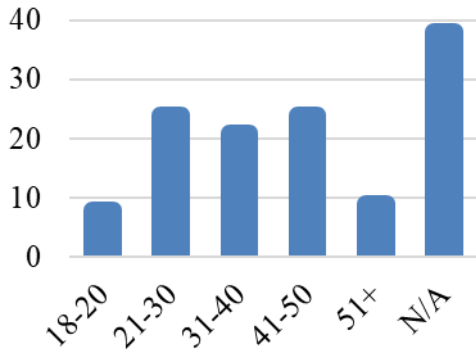


Figure 2: Age (n=124)

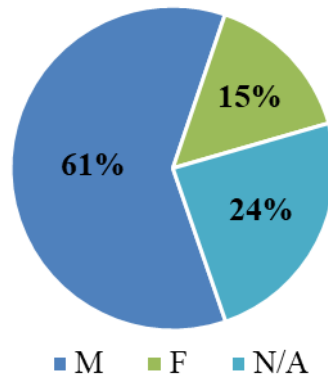


Figure 3: Sex (n=124)

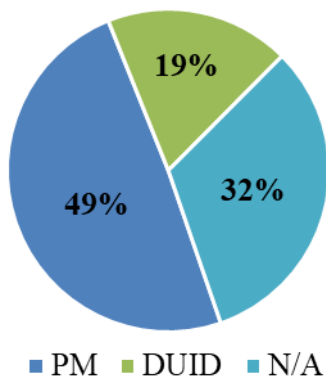


Figure 4: Case Type (n=124)

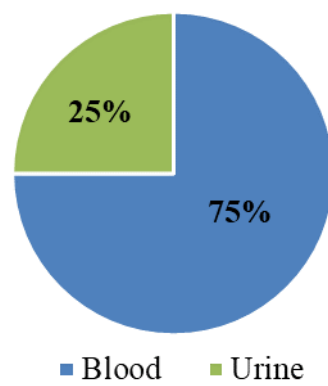


Figure 5: Matrix Type (n=124)

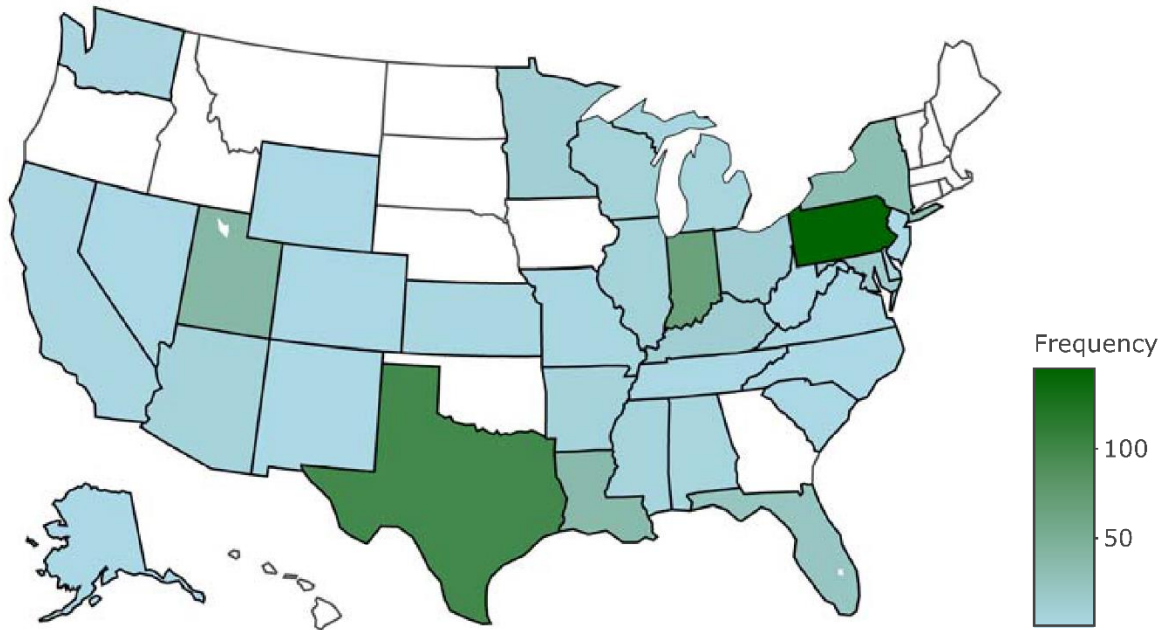


Figure 6: Heat Map of Synthetic Cannabinoid Positivity (July 2018 to September 2019)*

*Geographical distribution may be limited by location of agencies submitting samples and not necessarily representative of all jurisdictions.

Glossary of Synonyms

Reported Name	Synonym(s)
4-cyano CUMYL-BUTINACA	4-CN-CUMYL-BUTINACA
4F-MDMB-BINACA	4F-MDMB-BUTINACA
5F-ADB	5F-MDMB-PINACA
ACHMINACA	Adamantyl-CHMINACA
APP-BINACA	APP-BUTINACA
MMB-FUBINACA	FUB-AMB, AMB-FUBINACA