K48 Indazole-Carboxamide (NACA) Series Synthetic Cannabioids and Driving Impairment

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After attending this presentation, attendees will be able to describe and discuss the identity and prevalence of NACA compounds in drivers suspected of impaired driving and impairment associated with members of this group of analytes.

This presentation will impact the forensic science community by providing up-to-date information on the current generation of Synthetic Cannabinoids (SC) and their observed impairing effects on drivers.

SCs continue to pose a challenge to law enforcement and toxicologists in terms of establishing which drugs are emerging in drivers being investigated for impaired driving and the nature and severity of observed effects. In addition, and of great interest to the law enforcement community, is the degree of similarity of the impairing effects of the drugs to cannabis, according to the Drug Recognition Expert (DRE) matrix. The composition of SC products is constantly changing. As legislators work to control specific analytes, manufacturers change the drugs in the products in an attempt to evade these legal constrictions. Further, because of their novel nature and their unknown adverse effects, it is impossible to conduct clinical trials of these substances to evaluate their pharmacological properties and potential impairing effects. Consequently, DREs and toxicologists learn about the impairing effects of the drugs through case studies. This presentation describes one of the newest generations of SC designated as the "NACA" series due to their structural similarities, including an indazole-carboxamide group.

Between March 2015 and June 2015, SC testing was completed on 156 blood samples from cases submitted by police agencies. The database of suspected impaired driving cases was queried to identify cases which had tested positive for cases of the NACA drugs. The specific drugs tested by a Scientific Working Group for Toxicology (SWGTOX) -compliant validated method using liquid chromatography/tandem mass spectrometry encompassed: 5F-AB-001, 5F-ADBICA, 5F-ADB-PINACA, 5F-APICA, 5F-APINACA (5F-AKB-48), 5F-MN-18, 5F-PB-22, AB-CHMINACA, AB-FUBINACA, AB-PINACA, ADB-FUBINACA, ADBICA, ADB-PINACA, AM-2201, APICA, APINACA (AKB-48), BB-22, FUB-AKB-48, FUBIMINA, FUB-PB-22, **JWH-018**, **JWH-081**, **JWH-122**, **JWH-210**, MDMB-CHMINACA, MN-18, MN-25, PB-22, THJ-018, THJ-2201, **UR-144**, and **XLR-11**. Analytes in bold were quantified, all others were reported qualitatively. Cases were also tested by immunoassay for other analytes, including opiates, cannabinoids, benzodiazepines, amphetamines, barbiturates, cocaine, methadone, propoxyphene, and PCP. Case 4 in the second table below was also screened for zolpidem, but propoxyphene was not included.

Of the cases described, 74 (47%) were positive for at least one SC, and 23 of the positive cases (31%) contained two or more analytes. The positivity rate for each analyte is presented in the table below.

Analyte	# Positive	% Positive	Conc. (ng/mL)
AB-CHMINACA	35	22.4	
XLR-11	22	14.1	0.21-3.4
AB-FUBINACA	20	12.8	
AB-PINACA	19	12.2	
ADB-FUBINACA	3	1.9	
UR-144	3	1.9	0.34-6.2
ADB-PINACA	1	0.6	
FUB-PB-22	1	0.6	

The following table summarizes three cases which were positive for one or more "NACA" compounds.

*Presenting Author

Case #	Incident Time	Case Narrative	Blood Collection Time	Toxicology Results
2	22:15	Vehicle sitting in roadway, driver appeared unconscious. Upon awakening, appeared disoriented, slow speech, swaying while standing. Standardized Field Sobriety Tests (SFSTs): Walk and turn – could not keep balance, missed heel to toe, stepped off line; One-Leg Stand – hopped, swayed, raised incorrect foot. No DRE	23:17	AB-PINACA AB-CHMINACA
3*	14:20	Single vehicle crash. Driver interviewed in hospital. Witness accounts of driver crossing center line, leaving roadway, and striking tree. Driver admitted to blacking out due to smoking synthetic marijuana. No SFSTs or DRE.	18:00	AB-FUBINACA
4*	00:49	Passenger vehicle sitting on roadway in drive. Driver appeared to be passed out and upon wakening, appeared confused, sleepy, and uncooperative. SFSTs: Horizontal Gaze Nystagmus (HGN) – 4/6 clues; Walk and turn – could not perform; One-Leg Stand – swayed, raised arms, put foot down. DRE Conclusion: Cannabis and Narcotic Analgesics	02:49	AB-FUBINACA

*Same individual different incidents on different dates

In conclusion, investigators should consider testing for SC compounds in cases in which the history appears consistent with marijuana use, but in which initial testing for THC and its metabolites are negative or cannot explain the observed impairment. The scope of testing needs to be kept up to date with the rapidly changing market for SCs or else the risk of false-negative results for this impairing drug category is high.

Synthetic Cannabinoid, Driver, Impairment