The Synthetic Cannabinoids Evolution

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Synthetic Cannabinoids, often known as K2, made their way into the United States by 2010 and quickly became an alternative to marijuana. These compounds have many of the same psychotropic effects as marijuana; however, these compounds are not detectable using standard marijuana testing methods. Their use quickly became extremely popular in the probation/parole system as individuals could achieve the same effects without testing positive for drugs and violating their parole. These compounds also quickly became popular with workers in the oil and gas industries. Although the companies had prohibited marijuana within their drug programs, they did not have a prohibition on synthetic cannabinoids. Evidence of discarded packaging and impairment was the driving force to quickly include these compounds as a safety concern within their drug testing policies.

Clinical Reference Laboratory (CRL) responded to this industry need in 2010 and developed methods to screen and confirm K2 by LC-MS/MS for the initial compounds, which were identified as JWH-018 and JWH-073. Within weeks, this quickly evolved into a panel of 5 compounds and had grown to more than 20 compounds. The federal government quickly identified these compounds as a health and safety issue and included these with Schedule I compounds, which is the same category as marijuana, cocaine, LSD, and heroin. Due to the federal punishment for manufacture and distribution, these original compounds were eventually abandoned and replaced in distribution by new compounds which were not yet known to federal regulators.

The development of synthetic cannabinoids originated in the 1980s by pharmaceutical companies and universities around the world as a medical alternative to marijuana. These efforts were largely academic medical research to find a replacement for natural marijuana. This research had very little commercial success, and the body of research work basically remained dormant for 30 years before the evolution and mass production of these compounds from China with international distribution. China has since prohibited the production and distribution of these compounds, but the spark was lit for underground or illicit chemists throughout the world. Distribution has evolved from the early days, through gas stations and convenience stores, to internet sales in bulk quantities for subdividing and distribution. These chemicals are laboratory created and extremely powerful which makes distribution by pound, or even filled 55-gallon drums, hard to detect and extremely profitable. Shipments can then be subdivided into tens of thousands of doses.

For more than a decade, CRL has been the leader in the development of new assays and testing for our workplace clients. Approximately every 6 to 12 months, CRL has refreshed our K2 panel to include the newest compounds in circulation. The core of all K2 panels remains the original compounds frequently referred to as the "Oil and Gas Panel" developed by ExxonMobil in conjunction with the testing information generated by CRL. Over time, additional compounds have been added and others deleted based on their prevalence. Some compounds had early adoption but were quickly replaced due to their side effects, or short-lived upon classification as Schedule I. However, chemists have kept creating new illicit compounds, and we have witnessed multiple generations of compounds covering a minimum of eight different chemical families.

CRL released its latest panel of K2 compounds in February 2021, including 5 new compounds highlighted below. These new compounds now account for the vast majority of positive samples. The full panel of compounds is listed below and reflects the synthetic cannabinoid evolution available at CRL.

JWH-018/AM-2201	AB-FUBINACA	BB-22	MAB-CHMINACA
5-fluoro ADB	AB-PINACA/5-F-AB-PINACA	FUB-AMB	5-fluoro MDMB-PICA
5-fluoro AMB	ADBICA	JWH-073	MDMB-FUBINACA
UR-144	XLR-11	NM2201	4-F MDMB-BUTINACA
5-Fluoro-PB-22 (5F-PB-22)	ADB-PINACA	PB-22-(CUPIC)	5-fluoro-AKB57
AB-CHMINACA	AKB-48 (APINACA)	MDMB-4en-PICA	MDMB-4en-PINACA
4-cyano CUMYL-BUTINACA	4-fluoro MDMB BUTICA		

It is time again to revisit your panel and update to the latest compounds in circulation. For more information about synthetic cannabinoid testing, please contact us at toxsales@crlcorp.com.