

Quantitative Composition of Synthetic Cannabinomimetics in “Herbal High” Products

INTRODUCTION

Synthetic cannabinomimetics are chemical compounds that mimic the effect of Δ^9 -tetrahydrocannabinol (THC), the principle active ingredient of cannabis. Like THC, they bind to cannabinoid receptors in the brain and other organs. These cannabinoid receptor agonists, were initially developed as therapeutic agents for the treatment of pain. However, the desired properties could not be separated from unwanted psychoactive effects.

Several of these cannabinoids have been detected in herbal smoking mixtures and are sold as incense. These products are sold over the internet and at head shops with many different commercial names. The synthetic spiked ingredients in these are not listed on the product packaging. Some synthetic cannabinoids have been recently banned in many countries and a few states in the USA.

OBJECTIVES

The aim of our study was to identify and quantitate the psychoactive ingredients in herbal smoke preparations.

METHODS

30 different “Herbal High” products were purchased over the internet. Standard reference materials were purchased from Cayman Chemicals. 30mg of each product was extracted with 1mL methanol. Extracts were analyzed by EI GC/MS as such and as TMS-derivatives in full scan and SIM modes.

After identification of the active ingredients, calibration curves were prepared for the drugs detected. Three replicates of each product were quantitatively analyzed. JWH-compounds were analyzed without derivatization using Fentanyl-D₅ as the internal standard and CP 47,497-C8 was analyzed after TMS derivatization using 11-nor-9-carboxy Δ^9 THC-D₃ as the internal standard. The SIM ions monitor for each analyte are given in the table.

ANALYTE	QUANTITATIVE ION	QUALIFIER IONS	RETENTION TIME
JWH 018	341	284, 324	5.1
JWH 073	327	284, 310	4.95
JWH 250	214	144, 335	4.72
Fentanyl D ₅ (IS)	250	194, 151	4.39
CP 47,497-C8	377	476, 289	4.19
THC-COOH D ₃ (IS)	373	476, 491	4.53

RESULTS: QUANTITATIVE COMPOSITION

JWH 018, JWH 073, JWH 250 and CP 47,497-C8 were the only drugs detected in the herbal mixtures tested. Out of the 30 products, 13 (43%) contained only JWH 018. Figure 1 shows quantitative results for three replicates of each herbal mixture. Average JWH 018 concentrations of the replicates ranged from 6 to 28mg/g. One outlier in *Samurai Spirit* blend indicates uneven distribution of drug in the herbal material.

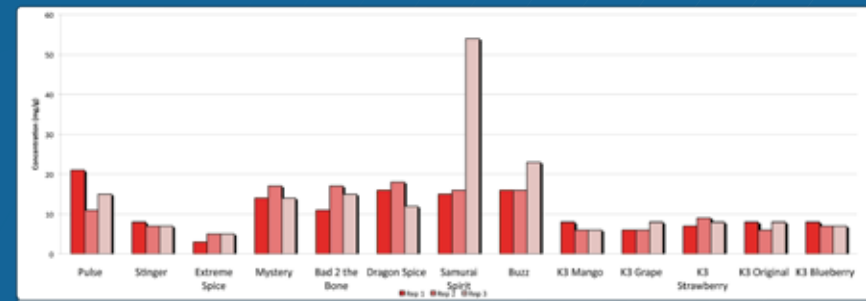


Figure 1: Quantitative results for herbal blends containing only JWH 018

Nine products (30%), including eight flavors of K2 tested, contained both JWH 018 and JWH 073. In all K2 preparations JWH 073 concentration was equal to or greater than JWH 018. In one product (S1 S. Werve), concentration of JWH 018 was greater than JWH 073. Results are presented in Figure 2 below. Average concentrations of the replicates ranged from 8 to 23mg/g for JWH 018 and 6 to 29mg/g for JWH 073.

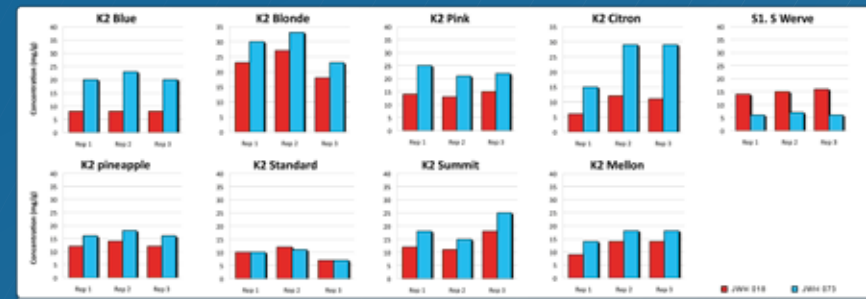


Figure 2: Quantitative results for herbal blends containing JWH 018 and JWH 073

Four products (13%) were found to contain only CP 47,497-C8. Results are presented Figure 3. Average concentrations of the replicates ranged from 10 to 14mg/g.



Figure 3: Quantitative results for herbal blends containing only CP 47,497-C8

Four products (13%) were found to contain three drugs, CP 47,497-C8, JWH 073 and JWH 250 in an approximate ratio of 7:2:1. Results are presented Figure 4.

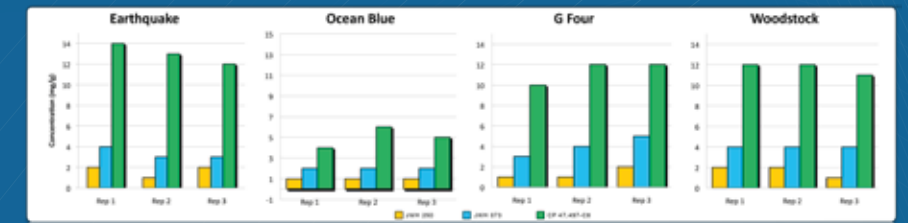


Figure 4: Quantitative results for herbal blends containing JWH 250, JWH 073 and CP 47,497-C8

Formulations could change without a notice!

Two Spike 99 Ultra smoking products purchased on different dates were found to have different composition of active ingredients: one contained CP 47,497-C8, the other JWH 018. It shows that not only concentration, but also a composition from batch to batch could be entirely different.

New products available on the market:

Herbal smoking blend *K3 Legal* and *Who Dat* has appeared on the market recently. GC/MS analysis revealed the composition of active ingredients: JWH 250, JWH 081 and JWH 019, which could be legally sold at this time.

CONCLUSION

- Concentrations of synthetic cannabinomimetics were determined in 30 “Herbal High” products.
- JWH 018, JWH 073, JWH 250 and CP 47,497-C8 were the active compounds detected.
- K2 products were found to contain the highest concentrations of active ingredients—JWH 018 and JWH 073.
- Considerable variations between three replicates of some brands (up to 34%) suggest uneven distribution of drugs in the plant material.

