IDENTIFICATION AND QUANTITATION OF 13 CANNABINOIDS IN WHOLE BLOOD BY UHPLC-MS/MS

Melissa Beals, Martin Jacques, Michael Clark, David Kuntz; Toxicology, Clinical Reference Laboratory, Lenexa, KS 66215

INTRODUCTION

Since the legalization of hemp in 2018, several of the more than 120 identified phytocannabinoids have become popular for recreational and naturopathic medical use. Detection and quantitation of these compounds is important for safety and compliance as their use is now widespread. The method developed by our laboratory provides a detailed analysis of whole blood specimens, evaluating the presence of 13 cannabinoids including Cannabidiol (CBD) and CBD metabolites at concentrations from 0.200 to 150 ng/mL

OBJECTIVE

Develop an analytical method for the extraction, detection, and quantitation of Cannabidiol (CBD), Cannabinol (CBN), (-)-Δ9-THC, (-)-Δ8-THC, 7-Carboxy Cannabidiol (7-COOH-CBD), 7-Hydroxy Cannabidiol (7-OH-CBD), 11-Hydroxy-THC (11-OH-THC), Δ 8-Carboxy-THC (Δ 8-COOH-THC), Δ 9-Carboxy-THC (Δ 9-COOH-THC), Cannabigerol (CBG), Cannabidiolic Acid (CBDA), Cannabicyclol (CBL), and Cannabichromene (CBC) in whole blood by LC-MS/MS for a controlled dosing research study.

400 µL of whole blood sample was mixed well with 40 µL of internal standard solution and 1 mL of cold 0.1% Formic Acid in Acetonitrile in appropriately labeled silanized glass culture tubes. 500 µL of 0.1% Formic Acid in DI H₂O was added to each tube, and the resulting mixture was loaded onto an Agilent Captiva EMR—Lipid 3 mL Cartridge inserted in a silanized glass culture tube. Tubes were centrifuged with cartridges in place to elute the samples. Following elution, the cartridge was rinsed with 80:20 Acetonitrile:DI H₂O and centrifuged again to elute the rinse into the same tube. A liquid-liquid extraction was then performed using the combined eluent and 2:1 Hexanes: Ethyl Acetate; the organic components were subsequently dried and reconstituted with 0.1% Formic Acid in 50:50 DI H₂O:Methanol.

RESULTS / DISCUSSION

A single-point calibrator at 5.0 ng/mL was used for quantitation. A low control at 2.0 ng/mL (40% of the calibrator), two positive controls at 6.25 ng/mL (125% of the calibrator), and two negative controls were run with each analytical batch, with one of the negative controls and one of the positive controls injected at the end of the batch to bracket donor samples. In addition to the low and positive controls, a conversion control was included in each batch. The conversion control was used for monitoring the potential conversion of CBD and its metabolites to $\Delta 9$ -THC and $\Delta 8$ -THC and corresponding metabolites, and contained CBD, 7-OH-CBD, 7-COOH-CBD, and CBDA at 5.0 ng/mL.

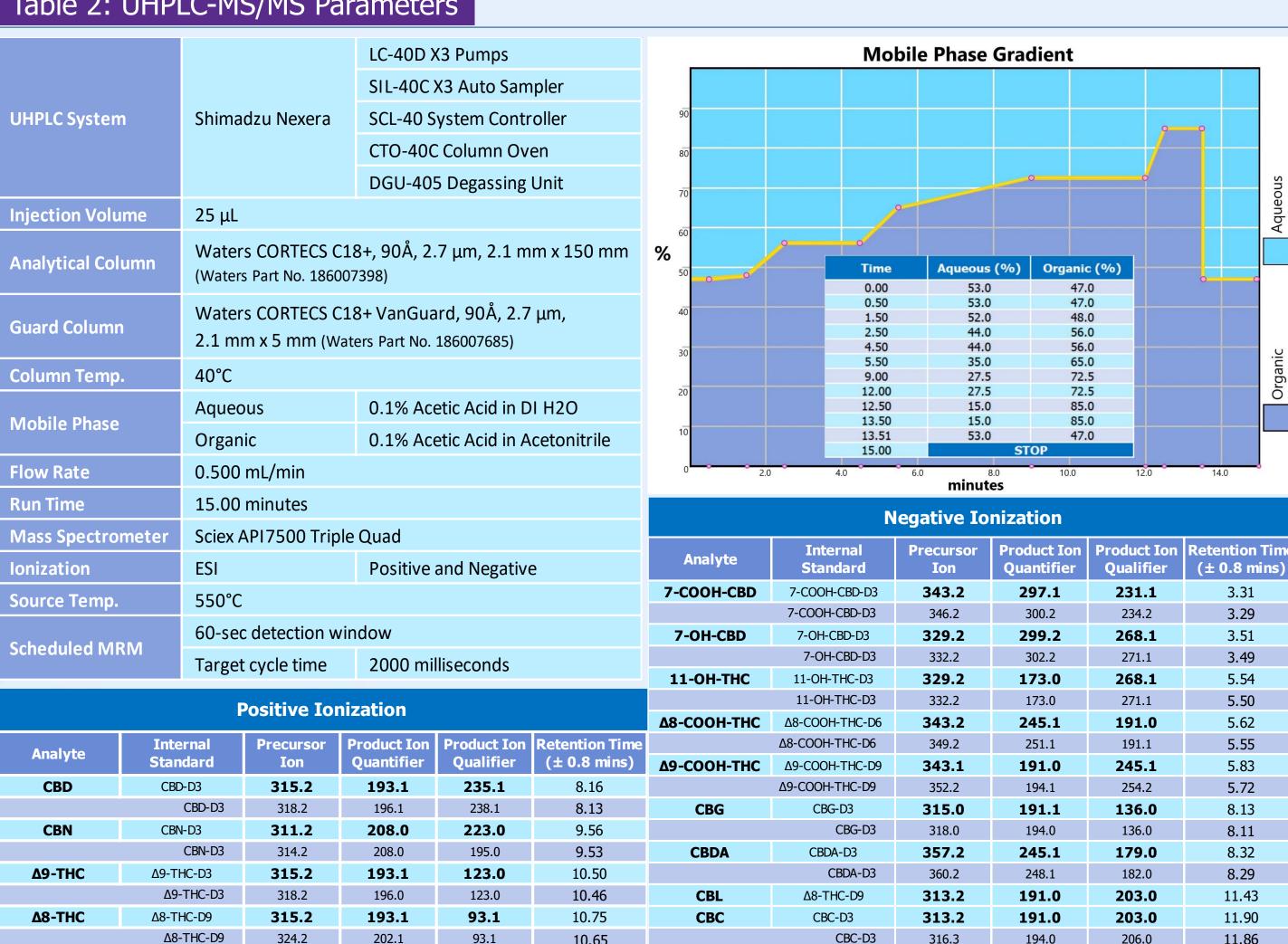
Linearity was determined and assay limits of detection and quantitation (LOD/LOQ) and upper limit of linearity (ULOL) were established through the analysis of cannabinoid-analyte spiked UTAK negative whole blood samples at concentrations ranging from 0.1 ng/mL to 150 ng/mL. Accuracy and precision were assessed for 5 replicates of each of 14 concentration levels, including 40%, 50%, 100%, 125%, 150%, and 200% of the calibrator. For LOD/LOQ assessment, at the 0.1 ng/mL level, no analytes had replicates that met quantitative acceptability criteria of within ±20 of target, and no replicates met all qualitative acceptance criteria (see Table 4). Replicates for CBD, CBN, CBDA, Δ8-THC, 7-COOH-CBD, 7 OH-CBD, 11-OH-THC, $\Delta 8$ -COOH-THC, and $\Delta 9$ -COOH-THC passed qualitatively and were within ± 20 of target at 0.2 ng/mL. Replicates for all analytes met quantitative and qualitative acceptance criteria at the 0.5 ng/mL level. At the upper limit of linearity, replicates for all analytes met full acceptance criteria at 50.0 ng/mL, and replicates for CBN, Δ9-THC, Δ8-THC, 7-COOH-CBD, 11-OH-THC, Δ8-COOH-THC, Δ9-COOH-THC, CBG, CBL, and CBC met full acceptance criteria at 150 ng/mL.

Table 1: Analyte LOD/LOQ and ULOL Accuracy and Precision

, , , , , , , , , , , , , , , , , , ,	, ,			<i>'</i>				
Analyte	LOD/LOQ (ng/mL)	Mean at LOD/LOQ	% Mean Accuracy	%CV	ULOL (ng/mL)	Mean at ULOL	% Mean Accuracy	%CV
CBD	0.200	0.201	100.3	4.52	50.0	47.55	95.1	2.44
CBN	0.200	0.212	106.1	8.67	150	153.2	102.2	5.95
Δ9-ΤΗС	0.500	0.547	109.4	2.79	150	139.9	93.3	5.12
Δ8-ΤΗС	0.200	0.212	105.9	4.95	150	137.2	91.5	4.33
7-COOH-CBD	0.200	0.234	117.2	2.44	150	135.5	90.3	7.42
7-OH-CBD	0.200	0.218	109.2	5.51	50.0	47.02	94.0	2.27
11-OH-THC	0.200	0.183	91.3	3.01	150	140.2	93.5	5.85
Δ8-СООН-ТНС	0.200	0.194	97.0	3.44	150	139.5	93.0	3.62
Δ9-СООН-ТНС	0.200	0.190	95.0	4.28	150	134.5	89.7	4.29
CBG	0.500	0.561	112.2	8.81	150	129.0	86.0	3.38
CBDA	0.200	0.212	106.1	8.67	50.0	47.37	94.7	4.89
CBL	0.500	0.447	89.4	6.09	150	140.5	93.7	8.96
CBC	0.500	0.519	103.8	5.83	150	136.9	91.3	3.56

INSTRUMENT PARAMETERS

Table 2: UHPLC-MS/MS Parameters



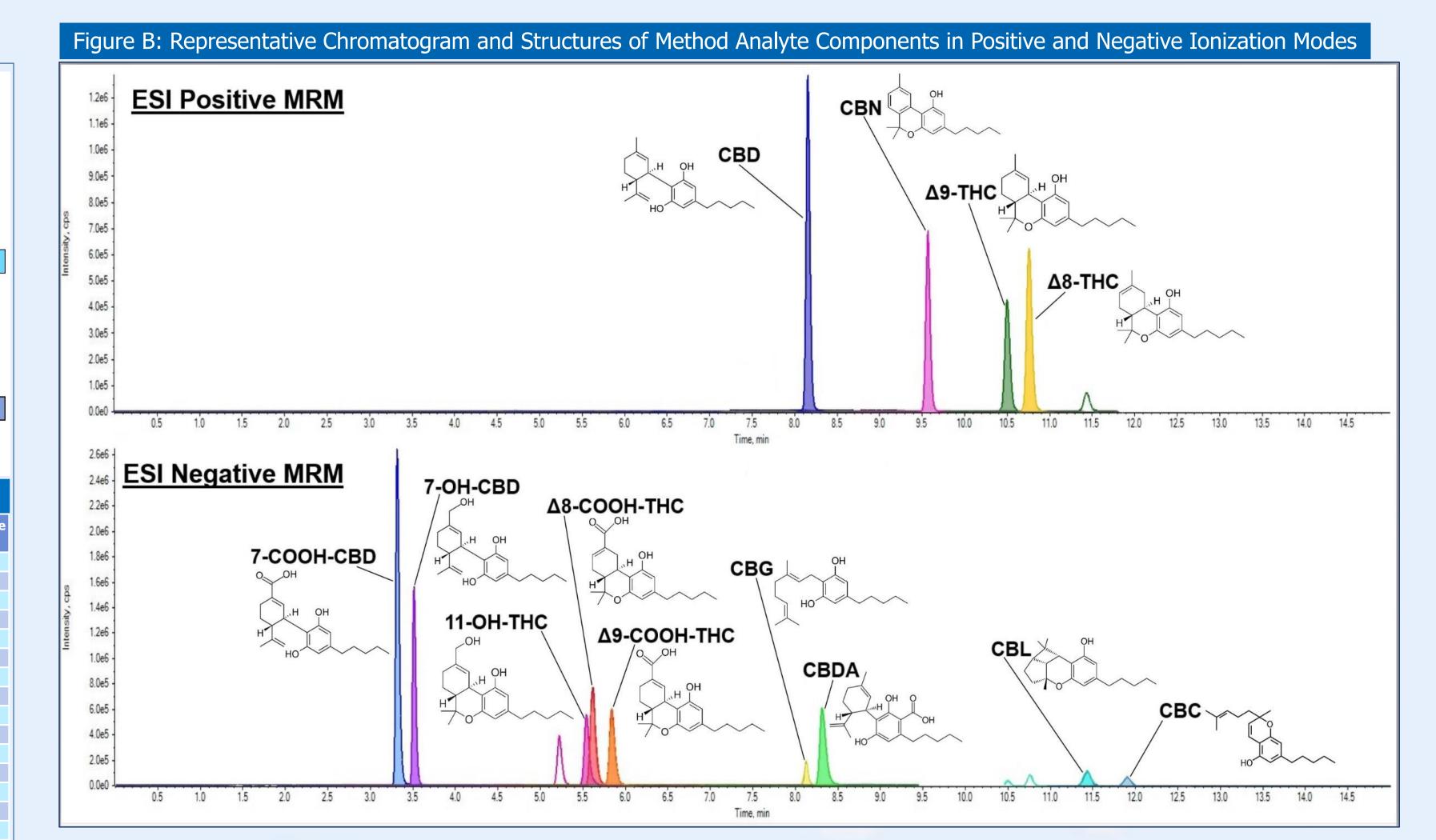


Figure A: Analyte Linearities

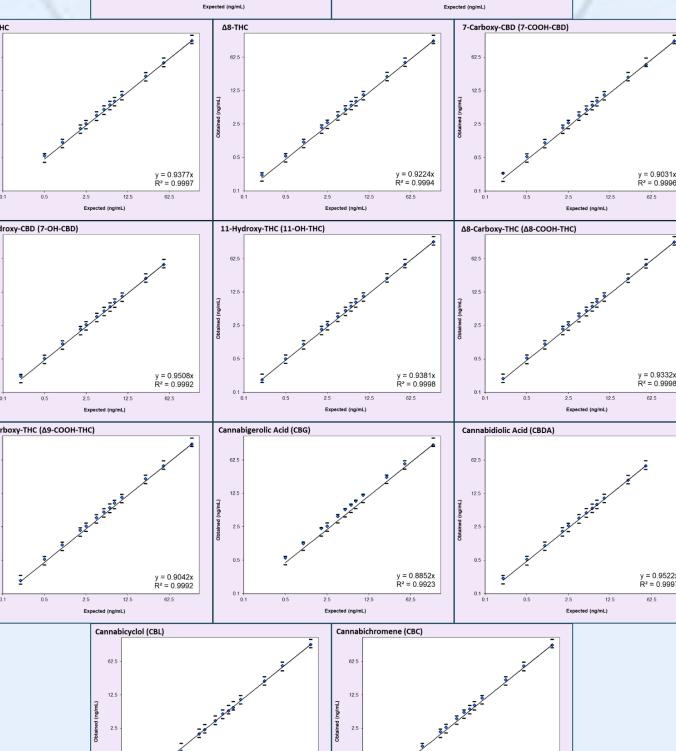


Table 4: Quantitative Acceptance Criteria

Relative Retention Time (RRT)

Internal Standard (IS) Response

Symmetry / Peak Shape

Ion Ratios (Qualifiers)

±2% of expected RRT of the

established by the batch calibrator

Total IS peak area = ≥10% of

asymmetry at 10% of peak height

= <3.0 for IS and quant peaks

Adjacent peaks ≥90% resolved

(≤ 10% valley/peak height ratio)

Ratio of abundance of quantitative

to qualifier ion = $\pm 20\%$ of target

Time (min)

Minimum Peak Resolution = 90% (10% valley/peak ratio)

calibrator IS peak area

Table 3: E				
Analytes	Carryover Check	Analyte Peak Area Counts	% of Calibrator Area	Ca
CBD	Negative after 50 ng/mL	2051.53	0.303	by
	Negative after 150 ng/mL	11588.97	0.667	sa
CDN	Negative after 50 ng/mL	1591.38	0.094	Ul
CBN	Negative after 150 ng/mL	1315.37	0.372	15
Δ9-ТНС	Negative after 50 ng/mL	8190.64	0.834	sa
Δ9-1ПС	Negative after 150 ng/mL	3754.82	0.441	pa
Δ8-ТНС	Negative after 50 ng/mL	811.97	0.050	ne
Д6-ТПС	Negative after 150 ng/mL	2028.49	0.249	nc
7-COOH-CBD	Negative after 50 ng/mL	1463.77	0.033	ac
	Negative after 150 ng/mL	5840.02	0.523	or
7-OH-CBD	Negative after 50 ng/mL	320.97	0.019	ar
7-011-000	Negative after 150 ng/mL	1422.26	0.207	CC
11-OH-THC	Negative after 50 ng/mL	1840.65	0.117	of
11-011-1110	Negative after 150 ng/mL	5998.79	1.620	ca
Δ8-СООН-ТНС	Negative after 50 ng/mL	639.52	0.030	ec
До-сооп-тіс	Negative after 150 ng/mL	2394.70	0.342	ea
Δ9-СООН-ТНС	Negative after 50 ng/mL	138.43	0.010	
A9-COOH-IIIC	Negative after 150 ng/mL	469.16	0.107	
CBG	Negative after 50 ng/mL	1308.23	4.932	
CDG	Negative after 150 ng/mL	1651.12	4.237	
CBDA	Negative after 50 ng/mL	465.83	0.036	
CDDA	Negative after 150 ng/mL	1297.15	0.098	
CBL	Negative after 50 ng/mL	63.29	0.021	
CBL	Negative after 150 ng/mL	191.16	0.117	

Carryover was tested y injecting negative samples after the ULOL (50 ng/mL and 150 ng/mL) spiked samples. Carryover passed for the negative samples, with no analytes having acceptable peak shape or ion ratios, and all analyte peak area counts less than 10% of the calibrator. The carryover limit was set equal to the ULOL for each analyte. Table 6: Interference Compounds Investigated (500 ng/mL)

Interference was assessed for the compounds listed in Table 6 at 500 ng/mL, which includes illicit, overthe-counter, and commonly prescribed drugs. The compounds were spiked in groups into a negative whole blood sample as well as a whole blood sample containing the cannabinoid analytes at 40% of calibrator concentration (2.0 ng/mL). Negative samples met acceptance criteria for a negative control, lacking acceptable analyte peak shape and ion ratios and having analyte peak area counts less than 10% of the calibrator. The 2.0 ng/mL spiked samples passed all qualitative acceptance criteria. Quantitatively, all analytes were within ±20% of target concentration with the exceptions of CBG and CBL. CBG and CBL yielded lower concentrations but were within 10% of acceptable range; no interference was seen with chromatography or internal standard recovery for either analyte. Throughout the interference study, no peaks were observed that were greater than the assay LOQ (0.2 or 0.5 ng/mL, analyte dependent), which could create possible quantitation or identification issues. All results were considered acceptable for validation.

Table 5: Evaluation of Matrix Effect

Brompheniramine

Diphenhydramine

Gabapentin

Quetiapine Sulfoxide

Tapentadol

Amitriptyline

ODM-Tramadol

Dextromethorphan

Pentazocine

7-Aminonitrazepam

7-Aminoclonazepam

Hydroxyalprazolan

Nordiazepam

Lorazepam

Oxazepam

Bromazepam

Triazolam

Prazepam

Phenmetrazine

Naltrexol

Doxylamine

ydroxyethylflurazepam

	Matrix Samples Spiked at 2.0 ng/mL								
Analytes	Mean Calculated Concentration (ng/mL)	Mean Accuracy	Std Dev						
CBD	1.9628	98.14	0.11						
CBN	2.2712	113.56	0.11						
Δ9-ТНС	2.3017	115.09	0.12						
Δ8-ΤΗС	2.1929	109.65	0.08						
7-COOH-CBD	1.8983	94.91	0.08						
7-OH-CBD	1.9337	96.69	0.06						
11-OH-THC	1.6989	84.94	0.09						
Δ8-СООН-ТНС	1.7282	86.41	0.07						
Δ9-СООН-ТНС	2.1298	106.49	0.10						
CBG	2.0831	104.16	0.09						
CBDA	2.1609	108.05	0.10						
CBL	2.1142	105.71	0.29						
CBC	2.2336	111.69	0.13						

Norsertraline

Norfluoxetine

Fluoxetine

Butalbital

Secobarbital

Phenobarbital

Butabarbital

Amobarbital

Propoxyphene

Ketamine

Norketamine

Methagualone

Phenylpropanolamine

Ephedrine

Pseudoephedrine

Phenylephrine

Phentermine

Acetaminophen

Ibuprofen

Naproxen

Caffeine

Hydroxycotinine

Cotinine

Amphetamine

MDMA

MDEA

The potential of sample matrix components to interfere with the analytical method was evaluated by testing ten random negative whole blood samples, extracted unaltered and with cannabinoid analytes spiked at 40% of the calibrator concentration (2.0 ng/mL). Results showed no indication of methodic ion suppression or enhancement, as component recovery was consistent and spiked samples passed with analyte concentrations within ±20% of target. All samples passed with acceptable chromatography as no qualitative issues were observed, and no interfering peaks were present in the negative samples that could be problematic in quantitation or

CONCLUSION

This UHPLC-MS/MS method demonstrated selectivity, accuracy, and reproducibility for the analysis of hundreds of samples in federally-sponsored research studies. Its application reliably identified and quantitated 13 cannabinoids at pg/mL levels, contributing to the scientific knowledge of cannabinoid metabolism and distribution in whole blood.

REFERENCES

analysis, 9(6), 905–915. https://doi.org/10.1002/dta.2092

Adams R., Cain C.K., McPhee W.D., Wearn R.B. (1941). Structure of cannabidiol, XII, Isomerization to tetrahydrocannabinols. Journal of the American Chemical Society, 63(8), 2209–2213. https://doi: 10.1021/ja01853a052. Agilent Technologies. (2017). Agilent Captiva EMR—Lipid Method Guide Applied Biosystems API 7500 LC-MS/MS Hardware Manual Cayman Chemical Reference Materials Cerilliant Analytical Reference Materials Coulter, C., & Wagner, J.R. (2021). Cannabinoids in Oral Fluid: Limiting Potential Sources of Cannabidiol Conversion to Δ9-

and $\Delta 8$ -Tetrahydrocannabinol. Journal of analytical toxicology, 45(8), 807–812. https://doi.org/10.1093/jat/bkab074 Day, D., Kuntz, D., Feldman, M. (2011). Oral Detection Test for Cannabinoid Use (U.S. Patent No. 7,977,107; Pat. No. 7.816.143 (2008); Pat. No. 7,465,586 (2004). https://patft.uspto.gov/ netacqi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l= 50&s1=7977107.PN.&OS=PN/7977107&RS=PN/7977107 Merrick, J., Lane, B., Sebree, T., Yaksh, T., O'Neill, C., & Banks, S.L. (2016). Identification of Psychoactive Degradants of Cannabidiol in Simulated Gastric and Physiological Fluid. Cannabis and cannabinoid research, 1(1), 102–112. https://doi.org/10.1089/can.2015.000 Pourseyed Lazarjani, M., Torres, S., Hooker, T., Fowlie, C., Young, O., & Seyfoddin, A. (2020). Methods for quantification of cannabinoids: a narrative review. Journal of cannabis research, 2(1), 35. https://doi.org/10.1186/s42238-020-00040-2 Sholler, D.J., Spindle, T.R., Cone, E.J., Goffi, E., Kuntz, D., Mitchell, J.M., Winecker, R.E., Bigelow, G.E., Flegel, R.R., & Vandrey, R. (2022). Urinary Pharmacokinetic Profile of Cannabidiol (CBD), Δ9-Tetrahydrocannabinol (THC) and Their Metabolites following Oral and Vaporized CBD and Vaporized CBD-Dominant Cannabis Administration. Journal of analytical toxicology, 46(5), 494-503. https://doi.org/10.1093/jat/bkab059 Substance Abuse and Mental Health Services Administration (SAMHSA), Department of Health and Human Services (2019). Mandatory Guidelines for Federal Workplace Drug Testing Programs—Oral/Fluid, 42 CFR Chapter I. Federal Register, 84(207), 57554-57600. https://www.govinfo.gov/content/pkg/FR-2019-10-25/pdf/2019-22684.pdf Swortwood, M.J., Newmeyer, M.N., Andersson, M., Abulseoud, O.A., Scheidweiler, K.B., & Huestis, M.A. (2017). Cannabinoid disposition in oral fluid after controlled smoked, vaporized, and oral cannabis administration. *Drug testing and*

Watanabe K., Itokawa Y., Yamaori S., Funahashi T., Kimura T., Kaji T., Usami, N., Yamamoto, I. (2007) Conversion of cannabidiol to delta-9-tetrahydrocannabinol and related cannabinoids in artificial gastric juice, and their pharmacological effects in mice. Forensic Toxicology, 25(1), 16-21. https://doi: 10.1007/s11419-007-0021-y

DISCLOSURE



March Marc																
The content		e C:	Re	pres	enta	ativ	e CF	RL M	ulti0	Qua	ant	Rep	ort			
Second Column			Carolina de la carolina del carolina de la carolina del carolina de la carolina d	Instrument	sc	IEX Triple	Quad	ate	100000						51	
### Comment 1968	oject	N/A	100		s/n F										1	
Company	Analyte Peak	Name 0) 1 (315.2 /	Conc (ng/mL)	lon F	Ratio	RT	RT	Peak Area	ion	acy	Confir				Notes	
March Marc	Cannabidiol (CBD 235.1) Cannabinol (CBN 208.0) Cannabinol (CBN) 2 (315.2 /		30.7	186.20% –	9.5700	1.0000	1044098.82 3159661.69								
Company	-)-Δ9-THC 1 (315 -)-Δ9-THC 2 (315 -)-Δ8-THC 1 (315	5.2 / 123.0) 5.2 / 193.1)		47.00% (54.2 25.40% (36.10% – 20%)	10.500	0 1.0000 0 1.0100	1286136.20 3974122.26								
The content of the	COOH-CBD 2 (3- 7-OH-CBD 1 (329 7-OH-CBD 2 (329	43.1 / 231.1) 9.2 / 299.2) 9.2 / 268.1)	10.226	99.50% (90%) 78.90% –	3.3100 3.5100 3.5100	1.0000 1.0000 1.0000	9231537.91 4504118.27 4481774.65		102.26		7-OH-C	BD-D3 1			
March Marc	1-OH-THC 2 (32) -THC-COOH 1 (3 -THC-COOH 2 (3	9.2 / 268.1) 343.1 / 245.1) 343.1 / 191.0)	10.482	86.00% (20%) 69.70% –	5.5400 5.6100 5.6100	1.0100 1.0100 1.0100	3759287.88 4170311.54 3588139.71		104.82		Δ8-THC-C	COOH-D6 1			
Communication Communicatio	CBG 2 (315.0	343.1 / 245.1) / 191.1) / 136.0)	11.243	177.4 112.10% (151.8	40%) 101.20% – 80%)	5.8300 8.1300 8.1300	1.0200 1.0000 1.0000	4049416.46 84180.86 94353.39		112.43		CBG	-D3 1		•	
Section Sect	-Cannabicyclol (C / 191.0) -Cannabicyclol (C / 203.0)	CBL) 1 (313.2) CBL) 2 (313.2		27.60% (23.40% –	11.440	0 1.0700 0 1.0700	666866.37 184128.74								
March Marc	(313.2 / 19 Cannabichromen (313.2 / 20	91.0) ne (CBC) 2 93.0) SID:10 ng	ı/mL	35.9	90%) C	11.900 alculated on Ratio	0 1.0000	108969.95	IS Peak		Integ	ration		o Confir	ms ID	1
1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.180 1.18	Cannab	pidiol (CBD)-D3 2 pinol (CBN)-D3 1	2 (318.2 / 2	38.1)	28.20% ((21.60% –	32.40%)	8.1300 9.5300	61423 92094	22.5 49.5						
Section Sect	(-)- <u>A</u>	\	318.2 / 123.0 324.2 / 202.1	1)	AND THE RESERVE OF THE PARTY OF		and the state of t	10.4600 10.6500	75623 26878	33.9 70.9						
The Control of Contr	7-CO 7-O 7-O	OH-CBD-D3 2 (33 H-CBD-D3 2 (33 H-CBD-D3 2 (33	(346.2 / 234 (32.2 / 302.2 (32.2 / 271.1	2)				3.3000 3.4900 3.4900	46642 25125 24745	03.3 80.2 26.0						
Section Sect	11-C Δ8-TH Δ8-TH	DH-THC-D3 2 (3 HC-COOH-D6 1 HC-COOH-D6 2	332.2 / 271. (349.2 / 25 (349.2 / 19	1.1)	Manager Carlo			5.5000 5.5400 5.5400	17451 17184 11635	16.6 50.3 30.3						
14.581-05.02.07.790	Δ9-TH	CBG-D3 1 (318.0 CBG-D3 2 (318.0	(352.2 / 254 .0 / 194.0) .0 / 136.0)				10100 1010	5.7300 8.1100 8.1100	21468 5273 5846	85.0 0.5 6.5						
The Property of the Control of Co	(-)- <i>L</i>	BDA-D3 2 (360 Δ8-THC-D9 1 (33 Δ8-THC-D9 2 (3	0.2 / 182.0) 324.2 / 202.1 324.2 / 93.1					8.2900 10.6500 10.6500	10618 26878 59325	66.8 70.9 57.2						
Consider (SE) 1	eak Review	w g/mL	3 / 206.0)				35.00%)	11.8600			20.01			√ v	fas:	
A	1 265 - 1 165 - 1 108 - 2 065 - 2 065 - 7 065 - 6 065 - 5 065 -	Parameter Parame	25e5- 25e5- 25e5-		112 113 100 90 700 90 90 90 90 90 90 90 90 90 90 90 90 9	266 - 166 - 306 - 306 - 306 - 306 - 306 - 306 -		765 - 666 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 - 665 -			1565 - 1.466 - 1.246 - 1.046 - 8.065 -		himsky	1.665 - 1.466 - 1.265 - 1.066 - 8.065 -		
10 10 10 10 10 10 10 10	Cannabidiol (me, min	Cann	Time, min	9.6 ne	7.9 st	Time min	165 - 160 - 162 - 163 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 - 165 -	nabinol (CB	in	20e5 00e0 Ca	nnabinol (CBN	1000	2.0e5 - 0.0e0 - 9.2	94 96 Time mo Ratio	9/8 10/0
10-24-77-C1	7e5 - 10.50 6e5 - 5e5 - 6e5 -)	25e5 - 30e5 - \$25e5 - 20e5 - 15e5 -	10 50	Viewsky	ne5 - le6 - le6 -	1900	746 - 665 - 665 - 546 - 465 - 365 -			1.8e5 - 1.6e5 - 1.4e5 - 1.2e5 - 1.0e5 - 8.0e4 -		бения	7e5 - 6e5 - 1 5e5 - 4e5 - 3e5 -	10.76	
7-COCHGIO 1 7-COC	1e5 102 104 Tin (-)-Δ9-TH	HC 1	5 Ge4 - 102 (-	-)-Δ9-THC 2	11.0	165 162 16. R	Time min atio	11.0 0e0 11.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1	-)-Δ8-THC	1	2 0e4 0 0e0	(-)-Δ8-THC 2		1/e6 - 15w6 -	106 108 11 Time no Ratio	0 1/2
7-COCH-GIO 1 7-COCH-GIO 2 7-CH-GIO 3 7-	2 Da6 - 1 Se6 - 1 De5 -		20e6 - 25e6 - 1.5e6 - 1.065 -		26 Security 11	5e6 - 5u6 -		1 366 - 1 266 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166 - 1 166			1.3e6 1.2e6 1.1e6 1.0e6 9.0e5 8.0e5 7.0a5 6.0e5 5.0e5 4.0e6		(Annual)	1366 - 1265 - 1166 - 1066 - 90a5 - 80a5 - 5065 - 5065 - 4065 - 30a5 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 1065 - 10		
11-CH-TRC1 11-CH-TRC2 11-CH-	7-COOH-C	CBD 1	7-C	COOH-CBD 2	3.6	30 R	tatio	1 045 - 0 040 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045 - 0 045	7-OH-CBD	1	0 0e0	7-OH-CBD 2		1045 - 00e0 -	22 34 36 Time min Ratio	3.8
11-CH-TriC21 11	4.0e5 - 3.5e5 - 3.0e5 - 2.0e5 - 1.5e5 - 1.0e5	· · · · · · · · · · · · · · · · · · ·	665 - 665 - 365 - 365 - 265 -		Brinnsky	5e5 - 5e5 - 3e5 -		6e5 - 5e6 - 4e5 - 3e5 - 2e5 -			565 - 655 - 365 - 265 -		Vermit	6e5 - 5e5 - 4e5 - 3e5 -		
AD-TH-CCOCH 2 AD-TH-	11-OH-TH	me, min	1.1e6 - 1.0e6 -	Time, min	1.1	1e6 - 1	Time, min	24000 - 22000 -	-THC-COO	in	1	8-THC-COOH		62	Sta 56 Time min Ratio	58 60
APTH-COOH 1 APTH-COOH 2 APTH-COOH 2 APTH-COOH 2 APTH-COOH 2 APTH-COOH 3 APTH-COOH 2 APTH-COOH 3 APTH-COOH 3 APTH-COOH 3 APTH-COOH 3 APTH-COOH 4 APTH-COOH 3 APTH-COOH 4 APTH-	5e5 - 4e5 - 3e6 - 2e5 -	opposet i	9 0e5 - 7.0e5 - 5.0e5 - 5.0e5 - 4.0e5 - 3.0e5 -		80 7.5 66 40 26 26	0e5 - 0e5 - 0e5 - 0e5 - 0e5 - 0e5 -		14000 - 14000 - 12000 - 10000 - 8000 - 4000 -			15000		Kenni	18000 -		
100	Δ9-THC-CC	DOH 1	Δ9-	THC-COOH 2	62 00	De0 5.4 5.6 R	Time, min	1345 - 1265 -	CBG 1	in	3564	CBG 2	8.4 8.6	1345-	80 62 Time no Ratio	8.4 8.6
CBDA 1 CBDA 1 CBDA 2 CBDA 2 CBDA 2 CBDA 2 CBDA 3 CB	6e5 - 6e5 -	linear	30e5		rinesaly	5e5 -	8.32 8 10 10 10 10 10 10 10 10 10 10 10 10 10	3 Do4 - 8 Co4 - 7 Co4 - 8 Do4 - 5 Co4 -		Λ	2004 - 2004 - 2004 -		(kensi)	3 0e4 - 8 0e4 - 7 0e4 - 6 0e4 - 5 0e4 -	lies.	Λ
Section Sect	CBDA	ne.min 1	5.0ed - 6.0	CBDA 2	0.0	1e5 - 10 st	Time min	2 0 0 4 1 0 0 0 0 0 0 0 0 0 0 5 6 5	nnabicyclol	in	(±)-C:	annabicyclol (C	500.00	2 0e4 - 1 0a4 - 0 0e0	12 114 116 Time rin Ratio	11.8
Cannabichromene (CBC) 1 Cannabichromene (CBC) 2 Cannabichromene (CBC) 3 Cannabichromene (CBC) 2 Cannabichromene (CBC) 3 Cannabichromene (CBC)	564	E Francisco	18000 - 16000 - 14000 - 12000 - 10000 - 8000 -		himaly	564 - ted -	11.50	5 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565 - 4 565			1.4e5 - 1.2e5 - 2 1.6e5 - 2 2 0e4 -		jemej	2.0e5 - 1.8e5 - 1.6e5 - 1.4e5 - 1.2e5 - 1.0e5 - 8.0e4 -		
1866 1866 1866 1866 1866 1866 1866 1866	Cannabichrome	ne (CBC) 1	2000 11.6 Cannabi	ichromene (CBC	12.4 C) 2	11.6 11.	atio	1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665 - 1 665	abidiol (CBD	in	2.0e4 0.0e0 Canr	nabidiol (CBD)-	and the second	2004 0000 92 Cannal	Time.min	98 100 D3 1
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 8a5 - 1 6e5 - 1 4e5 - 1 2e5 - 1 0e6 - 8 0e4 -	Pieces	30e5- 25e5- 9 20e5- 15e5-		12 65 10 10 80	465 - 0e5 - 0e5 -		5.645 4.545 4.665 3.545 3.065 2.545 2.665	10000000000000000000000000000000000000		1,1e5 1,0a5 9,0e4 8,0e4 7,0e4 6,0e4 5,0e4 4,0a4		(sean)	1.0e6 - 1.2u6 - 1.1e6 - 1.0u6 - 8.0u5 - 8.0e5 - 7.0u5 - 6.0e5 - 5.0e5 -		
1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366- 1366-	20e0 92 9.4 Cannabinol (C	BN)-D3 2	(-)-	Δ9-THC-D3 1	108	162 (-)-Δ9-1	THC-D3 2	5 664	-Δ8-THC-D	in	2 0e4 1 0e4 0 0e0	-)-Δ8-THC-D9		7-CC	00 92 ▼ 24 Time.min OH-CBD-D3	3 1
3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1366- 1365- 1166- 1065- 9065- 7065- 6065-	li mendo	745 - 645 - 655 - 465 -		Apaulii 4	ie5 - ie5 - ie5 -		2065 - 2065 - 1865 - 1665 - 1465 - 1265 - 1065 -			2.5e5		Kennij	3 0e5 - 2 5e5 - 2 0e5 -		
2465 5.94 2.665 4.665 1500 1600 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500 1500	40x5 30x5 20x5 10x5 20x5 7-COOH-CB	ne, min	2e5 - 1e5 - 0e0 -	DH-CBD-D3 1	23 0	92 7-OH-C	BD-D3 2	2 Dec - 111-	OH-THC-D	m	5 Co4 - 0 Co2 1	1-OH-THC-D3		5 0e4 0 0e0 Δ8-TH	52 54 556 Time min	
1665 8664 2665 8600 8600 8600 8600 1565 8600 8600 8600 8600 8600 8600 8600 8	2.265 - 2.065 - 1.665 - 1.665 -	554	1.8e5 - 1.6e5 - 1.4e5 -		4.0 3.5 3.0 2.5	le5 - le5 - le5 -	6.73	14000 - 13000 - 13000 - 11000 - 10000 - 9000 -	A.11		1600 - 1500 - 1400 - 1300 - 1200 - 1100 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 - 1000 -	A. 11	бенц	3545 - 2665 - 2545 -	6.29	
4 004 2 04 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1065- 8044- 6044- 4004- 2064- 0060- 52 SA Tir	ne.min	8 0e4 - 6.0e4 - 4 0e4 - 2 0e4 - 0 0e0 - 5/	Time, min	1.5 1.0 5.0	le5 -	Time, min	6000 - 5000 - 4000 - 3000 - 2000 -	Time.m	8.4 B6	7000 - 6000 - 5000 - 4000 - 3000 - 2000 -	Time, min	£4 £6	1.5e5 - 1.0e5 - 5.0a4 - 0.0e0 8.0	Time, min	86 81
Δ8-THC-COOH-D6 2	20e5 - 18e5 - 16e5 - 14e5 - 12e5 -		4 Ge4 - 3 Se4 - 3 Ge4 - 2 5u4 -		126 1 10 100 30 80	100 -			оо-D3 1		<u></u>	ово-03 2		C	BDA-D3 1	