

Analytical Test Report

	Final Report MCR-S1909423 Rev.01.00	
	Report Date: 1 APRIL 2019	

Sample ID #	Sample Name	Batch	Matrix	Date Received	Date Tested	Sample Weight
MCR-S19-09423	Hemp Oil MMB	N/A	Concentrate	27 March 2019	29 March 2019	N/A

The test results presented in this report are accurate, complete, and compliant with the MCR Labs quality control criteria.

Authorization




This test is accredited under the laboratory's ISO/IEC 17025 accreditation issued by ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1853

Reporting

Case Narrative:

For cannabinoids, the sample was extracted using organic solvents and analyzed via High Performance Liquid Chromatography (HPLC-UV). For heavy metals, the sample was extracted using nitric acid and microwave digestion, and analyzed via Inductively Coupled Plasma Mass Spectrometry (ICP-MS). For volatile organic compounds, the sample was analyzed via Gas Chromatography – Flame Ionization Detection with Headspace Autosampler (GC-FID) using full evaporative technique. The collected data was compared to data collected from analytical reference standards at known concentrations. Values reported below quantitation limits are for informational purposes.

This report and all information herein shall not be reproduced, except in its entirety, without the expressed consent of MCR Labs. Results apply only to the sample supplied to MCR Labs.

Requested Testing:

Test	Code	Procedure	Analytes Tested	Disposition
Cannabinoid Profile	CN	MCR-TM-0011	CBGA, CBG, THCA, Δ9-THC, Δ8-THC, CBDA, CBD, CBNA, CBN, CBCA, CBC, CBLA, CBL, CBDVA, CBDV, THCVA, THCV	N/A
Heavy Metals Screen	HM	MCR-TM-0008	Arsenic (As), Cadmium (Cd), Lead (Pb), Mercury (Hg)	Pass
Volatile Organics Screen	VC	MCR-TM-0007	Ethanol, Propane, Isobutane, N-butane, Hexane	Pass

Cannabinoid Profile [MCR-TM-0011]

Analyst: PS/GF

Test Date: 29 Mar 19

The sample was analyzed for cannabinoids via High Performance Liquid Chromatography (HPLC-UV). The collected data was compared to data collected from certified analytical reference standards at known concentrations.

Table 1. S19-09423 N/A-Hemp Oil MMB Concentrate Cannabinoid Testing

Analyte	Cannabinoid	Conc. (weight %)	Conc. (mg/g)	LOQ (weight %)	LOD (weight %)
CBDVA	Cannabidivarinic acid	ND	ND	0.20%	0.01%
CBDV	Cannabidivarin	0.4%	4	0.20%	0.03%
CBDA	Cannabidiolic acid	0.2%	2	0.20%	0.05%
CBGA	Cannabigerolic acid	ND	ND	0.20%	0.02%
CBG	Cannabigerol	1.5%	15	0.20%	0.02%
CBD	Cannabidiol	70.3%	703	0.20%	0.02%
THCV	Tetrahydrocannabivarin	ND	ND	0.20%	0.02%
THCVA	Tetrahydrocannabivarinic acid	ND	ND	0.20%	0.01%
CBN	Cannabinol	ND	ND	0.20%	0.02%
CBNA	Cannabinolic acid	ND	ND	0.20%	0.02%
Δ^9 -THC	Δ^9 -Tetrahydrocannabinol	2.8%	28	0.20%	0.04%
Δ^8 -THC	Δ^8 -Tetrahydrocannabinol	ND	ND	0.20%	0.05%
CBL	Cannabicyclol	ND	ND	0.20%	0.02%
CBC	Cannabichromene	3.1%	31	0.20%	0.03%
THCA	Tetrahydrocannabinolic acid	ND	ND	0.20%	0.06%
CBCA	Cannabichromenic acid	ND	ND	1%	0.05%
CBLA	Cannabicyclolic acid	ND	ND	0.20%	0.03%

Note: There are no limits established by the Massachusetts Department of Public Health for cannabinoid concentrations. ND = Not Detected. LOQ = limit of quantitation. LOD = limit of detection.

Heavy Metals Screen [MCR-TM-0008]

Analyst: AL/CD/DO

Test Date: 29 Mar 19

The sample was analyzed via Inductively Coupled Plasma Mass Spectrometry. The collected data was compared to data collected from certified analytical reference standards at known concentrations.

Table 2. S19-09423 N/A-Hemp Oil MMB Concentrate Heavy Metals Testing

Test ID	Test Analysis	Result, ppb	LOD ppb	LOQ ppb	Limits ppb	Disposition	Limits (ingestion) ppb	Disposition (ingestion)
19-09423-HM	Arsenic	ND	42.8	129.3	200	Pass	1500	Pass
19-09423-HM	Cadmium	ND	37.1	112.2	200	Pass	500	Pass
19-09423-HM	Mercury	ND	27.5	83.3	100	Pass	1500	Pass
19-09423-HM	Lead	ND	23.1	70.2	500	Pass	1000	Pass

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; BQL = Below Quantitation Limit; ppb = part per billion. Testing limits established by the Massachusetts Department of Public Health, Protocol for Sampling and Analysis of Finished Medical Marijuana Products and Marijuana-Infused Products for Massachusetts Registered Medical Marijuana Dispensaries, Exhibit 4.

VC Screen [MCR-TM-0007]

Analyst: VB

Test Date: 29 Mar 19

The sample was analyzed via Gas Chromatography – Flame Ionization Detection with Headspace Autosampler. The collected data was compared to data collected from certified analytical reference standards at known concentrations.

Table 3. S19-09423 N/A-Hemp Oil MMB Concentrate Volatile Organic Screen

Test ID	Analyte	Result, ppm	LOD	LOQ	Limits, ppm	Disposition
19-09423-VC	Propane	BQL	6	19	12	Pass
19-09423-VC	Isobutane	ND	10	35	12	Pass
19-09423-VC	n-Butane	4.9	11	38	12	Pass
19-09423-VC	Ethanol	BQL	454	1513	5000	Pass
19-09423-VC	Hexane	ND	1.3	6	290	Pass

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; BQL = Below Quantitation Limit; ppm = part per million. Testing limits established by the Massachusetts Department of Public Health, Protocol for Sampling and Analysis of Finished Medical Marijuana Products and Marijuana-Infused Products for Massachusetts Registered Medical Marijuana Dispensaries, Exhibit 7. The uncertainty budget for ethanol is 0.15 ppm; propane is 0.12 ppm; isobutane is 0.11 ppm; n-Butane is 0.10 ppm.

QA/QC

Cannabinoid Profile [MCR-TM-0011]

Analyst: AL

Test Date: 29 Mar 19

The sample data for certified reference standards was collected at known concentrations of cannabinoids in solution.

QC-0.05 mg/mL 17 cannabinoid multi-component 190211

ID	Cannabinoid	Nominal Prep Conc (mg/mL)	Measured Conc. (mg/mL)	Recovery (%)
CBDVA	Cannabidivarinic acid	0.05	0.049	98%
CBDV	Cannabidivarin	0.05	0.049	98%
CBDA	Cannabidiolic acid	0.05	0.052	104%
CBGA	Cannabigerolic acid	0.05	0.050	100%
CBG	Cannabigerol	0.05	0.051	101%
CBD	Cannabidiol	0.05	0.052	103%
THCV	Tetrahydrocannabivarin	0.05	0.049	98%
THCVA	Tetrahydrocannabivarinic acid	0.05	0.050	99%
CBN	Cannabinol	0.05	0.049	98%
CBNA	Cannabinolic acid	0.05	0.048	96%
Δ 9-THC	Δ 9-Tetrahydrocannabinol	0.05	0.049	98%
Δ 8-THC	Δ 8-Tetrahydrocannabinol	0.05	0.048	96%
CBL	Cannabicyclol	0.05	0.051	101%
CBC	Cannabichromene	0.05	0.048	96%
THCA	Tetrahydrocannabinolic acid	0.05	0.050	100%
CBCA	Cannabichromenic acid	0.05	0.049	98%
CBLA	Cannabicyclolic acid	0.05	0.053	106%

Criteria for successful analysis is QC recovery to be $\leq 20\%$ above or below nominal.

Heavy Metals Screen [MCR-TM-0008]

Analyst: AL/CD/DO

Test Date: 29 Mar 19

QC samples were prepared at target concentrations and injected at the end of the sequence.

Analyte	Prepared analyte concentration, ppb	Analyte measured, ppb	QC recovery (%)
Arsenic (As)	1.00	1.09	109%
Cadmium (Cd)	1.00	1.04	104%
Mercury (Hg)	0.50	0.4	80%
Lead (Pb)	3.00	2.9	97%

Criteria for successful analysis is QC recovery to be $\leq 20\%$ above or below nominal.

VC Screen [MCR-TM-0007]

Analyst: VB

Test Date: 29 Mar 19

A QC sample was prepared at a known concentration and injected.

Analyte	µg analyte detected	Nominal analyte, µg	Recovery
Hexane	4.7	5	94%
Ethanol	189	199	95%

Criteria for successful analysis is QC recovery to be $\leq 30\%$ above or below nominal.

END OF REPORT