

Analytical Test Report

Client: PJ Smith Enterprises LLC	Final Report PHR-S2001828 Rev.01.00 Report Date: 15 MAY 2020	Laboratory: PHR Labs, LLC 2020 Downyflake Lane, Suite 301 Allentown, PA 18103 215-220-9981
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Sample ID #	Sample Name	Batch	Matrix	Date Received	Date Tested	Sample Weight
PHR-S20-01828	CBD extract	J-20	Concentrate	12 May 2020	12-15 May 2020	12.68 g

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

Authorization



Corey Fitze
Chief Operating Officer

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-2685.01.



Case Narrative:

For cannabinoids, the sample was extracted using organic solvents and analyzed via High Performance Liquid Chromatography (HPLC-UV). For microbiological contaminants, the sample was prepared using cultured enrichments, was incubated for set periods of time, and analyzed via an automated Most Probable Number (MPN) methodology. For pathogenic bacterial contaminants, the sample was prepared using cultured enrichments, was incubated for set periods of time, and analyzed via an automated Enzyme Linked Fluorescent Assay (ELFA). For mycotoxin and pesticide contaminants, the sample was extracted using organic solvents, and analyzed via Liquid Chromatography - Tandem Mass Spectrometry (LC-MS/MS). 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. Total pesticide level exceeded regulatory limits. Values reported below quantitation limits are for informational purposes.

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Requested Testing:

Test	Code	Procedure	Analytes Tested
Cannabinoid Profile	CN	PHR-TM-0002	CBGA, CBG, THCA, Δ9-THC, Δ8-THC, CBDA, CBD, CBNA, CBN, CBCA, CBC, CBLA, CBL, CBDVA, CBDV, THCVA, THCV
Microbiological Screen	MB	PHR-TM-0001	Bacterial (Total Aerobic, Total Coliform, Bile-Tolerant Gram Negative), Yeast and Mold, Pathogenic (E. coli, Salmonella)
Mycotoxin Screen	MY	PHR-TM-0005	Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2, Ochratoxin A
Heavy Metals Screen	HM	PHR-TM-0006	Arsenic (As), Cadmium (Cd), Lead (Pb), Mercury (Hg)
Volatile Organics Screen	VC	PHR-TM-0004	n-Butane, Ethanol
Pesticides Screen	PS	PHR-TM-0005	Cyfluthrin, Hexythiazox, Piperonyl Butoxide, Acephate, Cypermethrin, Imazalil, Imidacloprid, Propiconazole, Acetamiprid, DDVP, Propoxur, Aldicarb, Malathion, Pyridaben, Azoxystrobin, Dimethoate, Metalaxyl, Methiocarb, Bifenthrin, Ethoprophos, Methomyl, Spiromesifen, Etofenprox, Spirotetramat, Carbaryl, Etoxazole, Mfgk-264, Spiroxamine, Carbofuran, Myclobutanil, Tebuconazole, Captan, Fenoxycarb, Naled, Thiacloprid, Chlorantraniliprole, Fenpyroximate, Oxamyl, Thiamethoxam, Trifloxystrobin, Chlorpyrifos, Flonicamid, Permethrins, Clofentezine, Fludioxonil
Terpene Screen	TP	PHR-TM-0003	α-Pinene, Camphene, β-Myrcene, β-Pinene, δ-3-Carene, α-Terpinene, Ocimene, δ-Limonene, p-Cymene, β-Ocimene, Eucalyptol, γ-Terpinene, Terpinolene, Linalool, Isopulegol, Geraniol, β-Caryophyllene, α-Humulene, Nerolidol 1, Nerolidol 2, Guaiol, Caryophyllene Oxide, α-Bisabolol

Cannabinoid Profile [PCR-TM-0002] *Analyst: JA* *Test Date: 12 May 20*
 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. 20-01828 CBD extract J-20 Concentrate Cannabinoid Testing

Analyte	Cannabinoid	Conc. (weight %)	Conc. (mg/g)	LOQ (weight %)	LOD (weight %)
CBDVA	Cannabidivarinic acid	ND	ND	0.001	0.000
CBDV	Cannabidivarin	0.3%	2.53	0.001	0.000
CBDA	Cannabidiolic acid	0.3%	3.23	0.001	0.000
CBGA	Cannabigerolic acid	ND	ND	0.001	0.000
CBG	Cannabigerol	1.1%	11.04	0.001	0.000
CBD	Cannabidiol	61.8%	617.63	0.001	0.000
THCV	Tetrahydrocannabivarin	0.2%	1.75	0.001	0.000
THCVA	Tetrahydrocannabivarinic acid	ND	ND	0.001	0.000
CBN	Cannabinol	BQL	BQL	0.001	0.000
CBNA	Cannabinolic acid	ND	ND	0.001	0.000
Δ9-THC	Δ9-Tetrahydrocannabinol	2.6%	26.40	0.001	0.001
Δ8-THC	Δ8-Tetrahydrocannabinol	ND	ND	0.001	0.000
CBL	Cannabicyclol	BQL	BQL	0.001	0.000
CBC	Cannabichromene	2.6%	25.90	0.001	0.000
THCA	Tetrahydrocannabinolic acid	ND	ND	0.001	0.000
CBCA	Cannabichromenic acid	0.7%	7.33	0.005	0.000
CBLA	Cannabicyclolic acid	ND	ND	0.001	0.000

Note: ND = Not Detected; LOQ = Limit of Quantitation; LOD = Limit of Detection; BQL = Below Quantitation Limit.

Microbiological Screen [PCR-TM-0001] *Analyst: EB* *Test Date: 12-15 May 20*
 The sample was analyzed for microbiological contaminants via an automated Most Probable Number (MPN) methodology with cultured enrichments.

Table. 2. 20-01828 CBD extract J-20 Concentrate Microbiological Testing

Test ID	Test Analysis	Results	Unit
20-01828-AC	Total Viable Aerobic Bacteria	<100	CFU/g
20-01828-YM	Total Yeast and Mold	<100	CFU/g
20-01828-CC	Total Coliforms	Not Teste ^d	CFU/g
20-01828-EB	Total Bile-Tolerant Gram Negative Bacteria	<100	CFU/g

Note: CFU = colony forming unit.

Pathogenic Bacterial Screen [PCR-TM-0001] Analyst: JA Test Date: 13 May 20

The sample was analyzed for pathogenic bacterial contamination via an automated Enzyme Linked Fluorescent Assay (ELFA).

Table. 3. 20-01828 CBD extract J-20 Concentrate Pathogen Testing

Test ID	Test Analysis	Result	Units
20-01828-ECPT	<i>E. coli (O157)</i>	Not Detected	N/A
20-01828-SPT	<i>Salmonella</i>	Not Detected	N/A

Mycotoxin Screen [PCR-TM-0005] Analyst: AP Test Date: 14 May 20

The sample was analyzed via Liquid Chromatography - Tandem Mass Spectrometry (LC-MS/MS).
The collected data was compared to data collected from analytical reference standards at known concentrations.

Table. 4. 20-01828 CBD extract J-20 Concentrate Mycotoxin Testing

Test ID	Test Analysis	Result	LOD (ppb)	LOQ (ppb)
20-01828-MY	<i>Aflatoxin B1</i>	ND	1	3.3
20-01828-MY	<i>Aflatoxin B2</i>	ND	1.9	6.3
20-01828-MY	<i>Aflatoxin G1</i>	ND	1.2	4
20-01828-MY	<i>Aflatoxin G2</i>	ND	1.1	3.6
20-01828-MY	<i>Ochratoxin A</i>	ND	2.3	7.6
20-01828-MY	<i>Total</i>	0	N/A	N/A

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; ppb = parts per billion.

Heavy Metals Screen [PCR-TM-0006] Analyst: JA Test Date: 12 May 20

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. 5. 20-01828 CBD extract J-20 Concentrate Heavy Metal Testing

Test ID	Test Analysis	Result (ppm)	LOD (ppm)	LOQ (ppm)
20-01828-HM	Arsenic (As)	ND	0.042	0.127
20-01828-HM	Cadmium (Cd)	ND	0.038	0.114
20-01828-HM	Mercury (Hg)	ND	0.022	0.066
20-01828-HM	Lead (Pb)	ND	0.021	0.063

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; BQL = Below Quantitation Limit; ppm = parts per million.

VC Screen [PCR-TM-0004] Analyst: JJ Test Date: 14 May 20

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. 6. 20-01828 CBD extract J-20 Concentrate Residual Solvent Testing

Test ID	Analyte	Result (ppm)	LOD (ppm)	LOQ (ppm)
20-01828-VC	n-Butane	ND	772.3	2574
20-01828-VC	Ethanol	ND	491.0	1637

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; BQL = Below Quantitation Limit; ppm = parts per million.

Pesticides Screen [PCR-TM-0005]

Analyst: EB

Test Date: 14 May 20

The sample was analyzed via Liquid Chromatography - Tandem Mass Spectrometry (LC-MS/MS).

The collected data was compared to data collected from analytical reference standards at known concentrations.

Table. 7. 20-01828 CBD extract J-20 Concentrate Pesticide Testing

Test Analysis	Result (µg/g)	LOD (µg/g)	LOQ (µg/g)
Cyfluthrin	ND	0.1666	0.5498
Hexythiazox	ND	0.0204	0.0673
Piperonyl Butoxide	ND	0.015	0.0494
Acephate	ND	0.0196	0.0648
Cypermethrin	ND	0.0341	0.1124
Imazalil	ND	0.0079	0.0259
Imidacloprid	ND	0.0347	0.1144
Propiconazole	ND	0.0157	0.0519
Acetamiprid	ND	0.0087	0.0288
DDVP	ND	0.0217	0.0716
Propoxur	ND	0.0198	0.0653
Aldicarb	ND	0.0133	0.0439
Malathion	ND	0.0199	0.0658
Pyridaben	ND	0.0145	0.0477
Azoxystrobin	ND	N/A	0.05
Dimethoate	ND	0.0149	0.0491
Metalaxyl	ND	0.0139	0.0459
Methiocarb	ND	0.0139	0.0458
Bifenthrin	ND	0.035	0.1154
Ethoprophos	ND	0.0188	0.0622
Methomyl	ND	0.0157	0.0519
Spiromesifen	ND	0.0255	0.0842
Etofenprox	ND	0.0145	0.048

Test Analysis	Result (µg/g)	LOD (µg/g)	LOQ (µg/g)
Spirotetramat	ND	0.0145	0.0842
Carbaryl	ND	0.0146	0.048
Etoxazole	ND	0.0112	0.0482
Mgk-264	ND	0.0113	0.037
Spiroxamine	N/A	0.1059	0.0372
Carbofuran	ND	0.019	0.3493
Myclobutanil	ND	0.0146	0.0627
Tebuconazole	ND	0.0148	0.0481
Captan	ND	0.017	0.049
Fenoxycarb	ND	N/A	0.0562
Naled	ND	0.0087	N/A
Thiacloprid	ND	0.0066	0.0288
Chlorantraniliprole	ND	0.0129	0.0217
Fenpyroximate	ND	0.0147	0.0428
Oxamyl	ND	0.0063	0.0484
Thiamethoxam	ND	0.0162	0.0207
Trifloxystrobin	ND	0.0116	0.0534
Chlorpyrifos	ND	0.0179	0.0384
Flonicamid	ND	0.0164	0.0591
Permethrins	ND	0.0095	0.054
Clofentezine	ND	N/A	0.0313
Fludioxonil	ND	0.0205	0.05

Note: ND = Not Detected; LOD = Limit of Detection; LOQ = Limit of Quantitation; ppb = parts per billion; N/A = not available.

Terpene Profile [PCR-TM-0003]

Analyst: JJ

Test Date: 13 May 20

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. 8. 20-01828 CBD extract J-20 Concentrate Terpene Testing

Terpene	Test Result
α -Pinene	ND
Camphene	ND
β -Myrcene	ND
β -Pinene	ND
δ 3-Carene	ND
α -Terpinene	ND
Ocimene	ND
δ -Limonene	ND
p-Cymene	ND
β -Ocimene	ND
Eucalyptol	ND
γ -Terpinene	0.03%
Terpinolene	ND
Linalool	0.04%
Isopulegol	ND
Geraniol	ND
β -Caryophyllene	0.52%
α -Humulene	0.16%
Nerolidol 1	ND
Nerolidol 2	0.05%
Guaiol	0.13%
Caryophyllene Oxide	ND
α -Bisabolol	0.12%
Sum	1.05%

Note: ND = Not Detected.

QA/QC

Cannabinoid Profile [PCR-TM-0002] Analyst: MD Test Date: 12 May 20

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 43921

ID	Cannabinoid	Nominal Prep Conc (mg/mL)	Measured Conc. (mg/mL)	Recovery (%)
CBDVA	Cannabidivarinic acid	0.05	0.047	94%
CBDV	Cannabidivarin	0.05	0.049	98%
CBDA	Cannabidiolic acid	0.05	0.053	106%
CBGA	Cannabigerolic acid	0.05	0.049	98%
CBG	Cannabigerol	0.05	0.050	99%
CBD	Cannabidiol	0.05	0.052	104%
THCV	Tetrahydrocannabivarin	0.05	0.051	101%
THCVA	Tetrahydrocannabivarinic acid	0.05	0.047	94%
CBN	Cannabinol	0.05	0.051	102%
CBNA	Cannabinolic acid	0.05	0.047	94%
Δ9-THC	Δ9-Tetrahydrocannabinol	0.05	0.051	101%
Δ8-THC	Δ8-Tetrahydrocannabinol	0.05	0.048	96%
CBL	Cannabicyclol	0.05	0.048	96%
CBC	Cannabichromene	0.05	0.049	98%
THCA	Tetrahydrocannabinolic acid	0.05	0.052	104%
CBCA	Cannabichromenic acid	0.05	0.049	98%
CBLA	Cannabicyclic acid	0.05	0.046	91%

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

Microbiological Screen [PCR-TM-0001] Analyst: JA Test Date:

Quality control checks are performed to confirm that the equipment used for reading incubated microbiological cultures, which are done at various concentrations, are working correctly and that the fluorescence readings are accurate. QC checks are performed within 30 days of the recorded measurements.

Date of most recent QC check:
 Status: Pass

Pathogenic Bacterial Screen [PCR-TM-0001]

Analyst: AP

Test Date: 30 Apr 20

Quality control checks are performed to validate the equipment used for reading incubated pathogenic bacterial cultures. E. coli QC checks are run at least every 14 days. Salmonella QC checks are run every 28 days.

Date	QC Check	Pathogen	Result	Disposition
5/5/2020	Control (+)	<i>E. coli</i> (O157)	Positive	Pass
5/5/2020	Control (-)	<i>E. coli</i> (O157)	Negative	Pass
5/5/2020	Standard 1	<i>E. coli</i> (O157)	N/A	N/A
5/5/2020	Standard 2	<i>E. coli</i> (O157)	N/A	N/A
4/30/2020	Control (+)	<i>Salmonella</i>	Positive	Pass
4/30/2020	Control (-)	<i>Salmonella</i>	Negative	Pass
4/30/2020	Standard 1	<i>Salmonella</i>	N/A	N/A
4/30/2020	Standard 2	<i>Salmonella</i>	N/A	N/A

Mycotoxin Screen [PCR-TM-0005]

Analyst: AP

Test Date: 14 May 20

Solutions were spiked with toxin reference materials at given concentrations and tested for toxin presence.

QC Sample	Total Toxins (ppb)	Result
Negative Control	0	Negative
Positive Control 20 ppb	20.0	Positive

Heavy Metals Screen [PCR-TM-0006]

Analyst: JA

Test Date: 12 May 20

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)	2.00	2.36	118%
Cadmium (Cd)	2.00	2.3	115%
Mercury (Hg)	0.50	2	100%
Lead (Pb)	6.00	5.86	98%

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

VC Screen [PCR-TM-0004]

Analyst: JJ

Test Date: 13 May 20

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

Analyte	Analyte detected (ppm)	Nominal analyte (ppm)	Recovery (%)
Ethanol	101	100	101%

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

Pesticides Screen [PCR-TM-0005] Analyst: EB AT
aly Test Date: 14 May 20

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

Test Analysis	Prepared analyte concentration (µg/g)	Result	Test Analysis	Prepared analyte concentration (µg/g)	Result
Cyfluthrin	0.1500	Detected	Spirotetramat	0.1500	Detected
Hexythiazox	0.1500	Detected	Carbaryl	0.1500	Detected
Piperonyl Butoxide	0.1500	Detected	Etoxazole	0.1500	Detected
Acephate	0.1500	Detected	Mgk-264	0.1500	Detected
Cypermethrin	0.1500	Detected	Spiroxamine	0.1500	Detected
Imazalil	0.1500	Detected	Carbofuran	0.1500	Detected
Imidacloprid	0.1500	Detected	Myclobutanil	0.1500	Detected
Propiconazole	0.1500	Detected	Tebuconazole	0.1500	Detected
Acetamiprid	0.1500	Detected	Captan	0.1500	Detected
DDVP	0.1500	Detected	Fenoxycarb	0.1500	Detected
Propoxur	0.1500	Detected	Naled	0.1500	Detected
Aldicarb	0.1500	Detected	Thiacloprid	0.1500	Detected
Malathion	0.1500	Detected	Chlorantraniliprole	0.1500	Detected
Pyridaben	0.1500	Detected	Fenpyroximate	0.1500	Detected
Azoxystrobin	0.1500	Detected	Oxamyl	0.1500	Detected
Dimethoate	0.1500	Detected	Thiamethoxam	0.1500	Detected
Metalaxyl	0.1500	Detected	Trifloxystrobin	0.1500	Detected
Methiocarb	0.1500	Detected	Chlorpyrifos	0.1500	Detected
Bifenthrin	0.1500	Detected	Flonicamid	0.1500	Detected
Ethoprophos	0.1500	Detected	Permethrins	0.1500	Detected
Methomyl	0.1500	Detected	Clofentezine	0.1500	Detected
Spiromesifen	0.1500	Detected	Fludioxonil	0.1500	Detected
Etofenprox	0.1500	Detected			

Terpene Profile [PCR-TM-0003]

Analyst: JJ

Test Date: 13 May 20

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.

Terpene	Nominal Prep Conc (mg/mL)	Measured Conc. (mg/mL)	Recovery (%)
α -Pinene	55.9	62.6	112%
Camphene	54.5	59.4	109%
β -Myrcene	55.4	61.5	111%
β -Pinene	54.4	59.2	109%
δ 3-Carene	55.7	61.8	111%
α -Terpinene	57.0	64.9	114%
Ocimene	47.4	45.0	95%
δ -Limonene	54.1	62.2	115%
p-Cymene	57.3	61.9	108%
β -Ocimene	49.5	49.0	99%
Eucalyptol	54.4	59.3	109%
γ -Terpinene	52.2	54.2	104%
Terpinolene	55.4	61.5	111%
Linalool	50.4	50.9	101%
Isopulegol	45.7	41.6	91%
Geraniol	49.5	49.0	99%
β -Caryophyllene	55.8	62.5	112%
α -Humulene	51.5	53.1	103%
Nerolidol 1	52.8	55.9	106%
Nerolidol 2	53.1	56.2	106%
Guaiol	58.9	69.5	118%
Caryophyllene Oxide	59.3	69.9	118%
α -Bisabolol			

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

END OF REPORT