

CERTIFICATE OF ANALYSIS:
CRYSTALLINE CANNABIDIOL



Product Name

CC - Crystalline Cannabidiol

Batch Number

190078FE

Manufacture Date

July 29, 2019

Expiration Date

July 2021

Botanical Source

Industrial hemp, grown and processed in Kentucky, USA in compliance with Section 7415 of the Farm Bill and applicable Kentucky State Law and State Department of Agriculture regulations.

Product Description

This product is hemp derived crystalline cannabidiol, isolated through CO₂ extraction and crystal precipitation.

Qualitative Analysis

OBSERVATION	METHOD	RESULT
Foreign Matter	Gross Visual	Absent
Color	Gross Visual	White to Pale Yellow
Molds & Mildews	Gross Visual	Absent
Smell	Olfactory	Orderless to Slight Terpenoid
Product Feel	Tactile	Fine Powder

Quantitative Analysis

Cannabinoid Analysis**

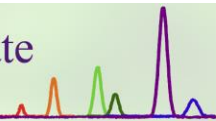
RESULT: PASS

IDENTIFICATION	METHOD	RESULT
Cannabinoid	HPLC-DAD	%wt/wt
Cannabidiolic Acid (CBDA)	HPLC-DAD	N/D
Cannabidiol (CBD)	HPLC-DAD	99.31%
Cannabidivarin (CBDV)	HPLC-DAD	0.20%
Tetrahydrocannabinolic Acid (THCA)	HPLC-DAD	N/D
Δ -9-Tetrahydrocannabinol (Δ -9-THC)	HPLC-DAD	N/D
Cannabinol (CBN)	HPLC-DAD	N/D
Cannabichromene (CBC)	HPLC-DAD	0.02%

**Denotes third party analysis. Source data available upon request.

N/A NOT APPLICABLE TO PRODUCT TYPE

N/D NOT DETECTED



Certificate ID: **60631**

Received: **8/2/19**

Scan QR Code for authenticity



GenCanna

Client Sample ID: **190078FE**

Lot Number:

Matrix: **Concentrates/Extracts - Isolate**

Authorization: Jon Podgorni, Lab Manager	Signature: <i>Jon Podgorni</i>	Date: 8/9/2019
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The data contained within this report was collected in accordance with the requirements of ISO/IEC17025:2017. I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the test article listed in this report. Reports may not be reproduced except in their entirety.

CN: Cannabinoid Profile & Potency [WI-10-17 & WI-10-17-01]

Analyst: *JSG*

Test Date: *8/7/2019*

The client sample was analyzed for plant-based cannabinoids by Liquid Chromatography (LC). The collected data was compared to data collected for certified reference standards at known concentrations.

60631-CN

ID	Weight %	Concentration (mg/g)		
D9-THC	ND	ND		
THCV	ND	ND		
CBD	99.31	993.10		
CBDV	0.20	1.96		
CBG	ND	ND		
CBC	0.02	0.18		
CBN	ND	ND		
THCA	ND	ND		
CBDA	ND	ND		
CBGA	ND	ND		
D8-THC	ND	ND		
exo-THC	ND	ND		
Total	99.52	995.24	0%	Cannabinoids (wt%) 99.3%
Max THC	-	-		
Max CBD	99.31	993.10		

Limit of Quantitation (LOQ) = 0.005 wt%

Max THC (and Max CBD) are calculated values for total cannabinoids after heating, assuming complete decarboxylation of the acid to the neutral form. It is calculated based on the weight loss of the acid group during decarboxylation: Max THC = (0.877 x THCA) + THC. This calculation does not include other cannabinoid isomers (eg. D8-THC and exo-THC). ND = None detected above the limits of detection (LLD)

EA: Elemental Analysis [WI-10-13]

Analyst: JFD

Test Date: 8/7/2019

This test method was performed in accordance with the requirements of ISO/IEC 17025. These results relate only to the test article listed in this report. Reports may not be reproduced except in their entirety.

60631-EA

Symbol	Metal	Conc. ¹	MDL	Limits ²	Status
Al	Aluminum	687 ug/kg	5 ug/kg	-	
As	Arsenic	ND	4 ug/kg	150 ug/kg	PASS
Cd	Cadmium	ND	1 ug/kg	2500 ug/kg	PASS
Ca	Calcium	2,220 ug/kg	500 ug/kg	-	
Cr	Chromium	117 ug/kg	5 ug/kg	-	
Co	Cobalt	ND	10 ug/kg	-	
Cu	Copper	ND	500 ug/kg	100000 ug/kg	PASS
Fe	Iron	472 ug/kg	5 ug/kg	-	
Pb	Lead	ND	2 ug/kg	500 ug/kg	PASS
Mg	Magnesium	4,635 ug/kg	500 ug/kg	-	
Mn	Manganese	ND	500 ug/kg	-	
Hg	Mercury	ND	2 ug/kg	1500 ug/kg	PASS
Mo	Molybdenum	ND	50 ug/kg	10000 ug/kg	PASS
Ni	Nickel	75 ug/kg	50 ug/kg	50000 ug/kg	PASS
P	Phosphorus	6,304 ug/kg	500 ug/kg	-	
K	Potassium	6,806 ug/kg	5 ug/kg	-	
Se	Selenium	ND	10 ug/kg	-	
Ag	Silver	ND	10 ug/kg	-	
S	Sulfur	4,940 ug/kg	5 ug/kg	-	
Sn	Tin	ND	5000 ug/kg	-	
Zn	Zinc	330 ug/kg	5 ug/kg	-	

1) ND = None detected to the Method Detection Limit (MDL)

2) USP recommended maximum daily limits for oral drug product.

MB1: Microbiological Contaminants [WI-10-09]

Analyst: MM

Test Date: 8/5/2019

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60631-MB1

Symbol	Analysis	Results	Units	Limits*	Status
AC	Total Aerobic Bacterial Count	<100	CFU/g	10,000 CFU/g	PASS
CC	Total Coliform Bacterial Count	<100	CFU/g	100 CFU/g	PASS
EB	Total Bile Tolerant Gram Negative Count	<100	CFU/g	100 CFU/g	PASS
YM	Total Yeast & Mold	<100	CFU/g	1,000 CFU/g	PASS

Note: All recorded Microbiological tests are within the established limits.

MB2: Pathogenic Bacterial Contaminants [WI-10-10]

Analyst: LabAdmin

Test Date: 8/6/2019

This test method was performed in accordance with the requirements of ISO/IEC 17025. These results relate only to the test article listed in this report. Reports may not be reproduced except in their entirety.

60631-MB2

Test ID	Analysis	Results	Units	Limits*	Status
60631-ECPT	E. coli (O157)	Negative	NA	Non Detected	PASS
60631-SPT	Salmonella	Negative	NA	Non Detected	PASS

Note: All recorded pathogenic bacteria tests passed.

MY: Mycotoxin Testing [WI-10-05]

Analyst: AKR

Test Date: 8/7/2019

This test method was performed in accordance with the requirements of ISO/IEC 17025. These results relate only to the test article listed in this report. Reports may not be reproduced except in their entirety.

60631-MY

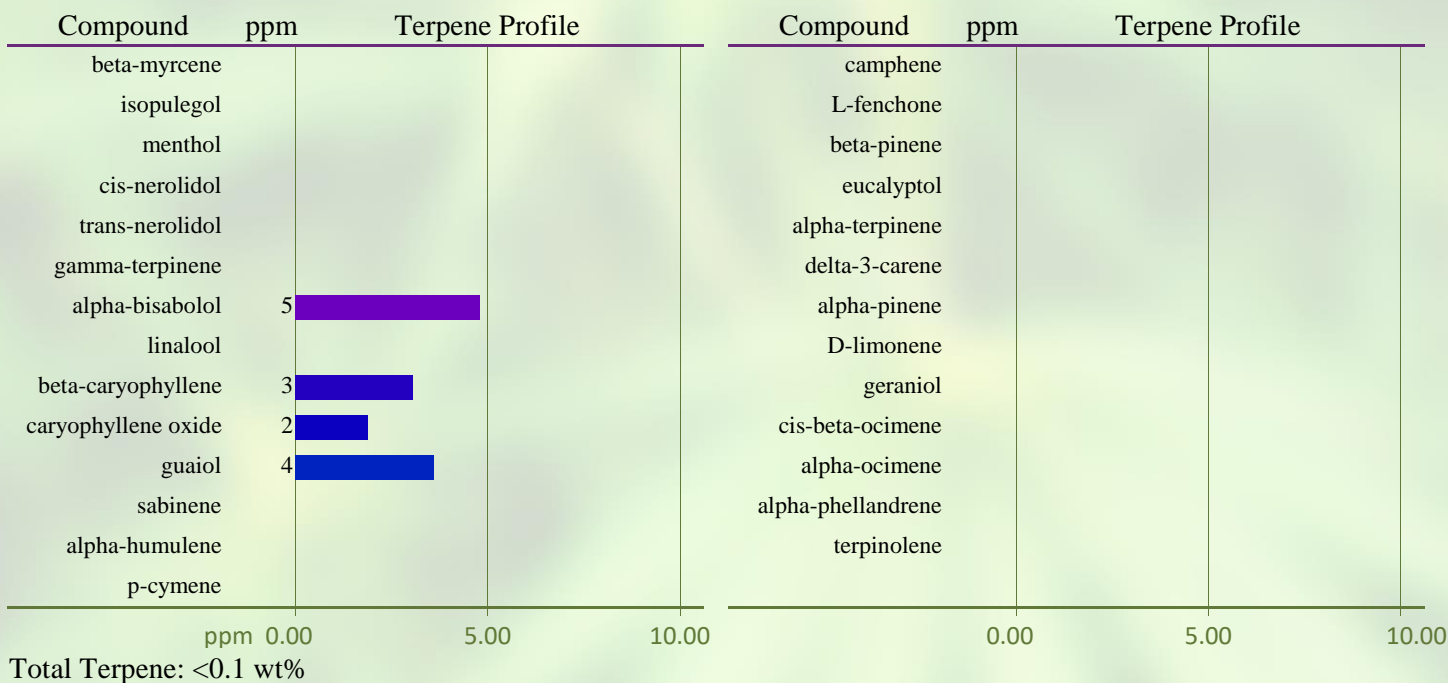
Test ID	Date	Results	MDL	Limits	Status*
Total Aflatoxin	8/7/2019	< MDL	2 ppb	< 20 ppb	PASS
Total Ochratoxin	8/7/2019	< MDL	3 ppb	< 20 ppb	PASS

TP: Terpenes Profile [WI-10-27]

Analyst: CMA

Test Date: 8/5/2019

The client sample was analyzed by Head-Space Gas Chromatography (HS-GC). The collected data was compared to data collected for certified reference standards at known concentrations. All values are semiquantitative estimates based on recorded peak areas relative to terpene calibration data.

60631-TP**VC: Analysis of Volatile Organic Compounds [WI-10-28]**

Analyst: CMA

Test Date: 8/6/2019

The client sample was analyzed by Head-Space Gas Chromatography (HS-GC). The collected data was compared to data collected for certified reference standards at known concentrations.

60631-VC

Compound	CAS	Amount ¹	Limit ²	RL	Status
Propane	74-98-6	ND	1,000 ppm	200	PASS
Isobutane	75-28-5	ND	1,000 ppm	200	PASS
Butane	106-97-8	ND	1,000 ppm	200	PASS
Methanol	67-56-1	ND	3,000 ppm	200	PASS
Pentane	109-66-0	ND	5,000 ppm	200	PASS
Ethanol	64-17-5	ND	5,000 ppm	200	PASS
Acetone	67-64-1	ND	5,000 ppm	200	PASS
Isopropanol	67-63-0	ND	5,000 ppm	200	PASS
Acetonitrile	75-05-8	ND	410 ppm	200	PASS
Hexane	110-54-3	ND	290 ppm	200	PASS
Heptane	142-82-5	ND	5,000 ppm	200	PASS

1) ND = Not detected at a level greater than the Reporting Limit (RL).

2) In ppm, based on USP recommended limits for residual solvents, adopted by the Massachusetts Department of Public Health on 3/31/16. Butane/Propane limits are based on limits established for state of Colorado.

END OF REPORT

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GenCanna Global
4274 Colby Rd.
Winchester, KY 40391

Report Number: P192017
Report Date: August 15, 2019
Client Project ID:

Client Sample ID: 190078 FE
PAL Sample ID: P192017-01

Sample Date: 07/30/2019
Received Date: 08/06/2019
Extraction Date: 08/07/2019

Certificate of Analysis

Table with 10 columns: Analysis Date, Analyte, Amount Detected, LOQ (mg/kg), Notes, Analysis Date, Analyte, Amount Detected, LOQ (mg/kg), Notes. Contains two columns of data for JASBC 69(3):121-126, 2011 (GC-MS/MS).

Handwritten signature of Rick Jordan



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(Continued)

Table with 10 columns: Analysis Date, Analyte, Amount Detected, LOQ (mg/kg), Notes, Analysis Date, Analyte, Amount Detected, LOQ (mg/kg), Notes. Contains two sections of data: JASBC 69(3):121-126, 2011 (GC-MS/MS) and JASBC 69(3):121-126, 2011 (LC-MS/MS).

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Notes and Definitions

<u>Notes</u>	<u>Definition</u>
LOQ	Limit of Quantitation
ND	Not Detected
*	Not included under current scope of accreditation

The results contained in this report relate only to the items tested.
 The results reflect the condition of the samples as received by PAL.
 Samples will be stored for a minimum of 60 days after the final report is issued, as described in our Quality Manual.
 Reports should not be reproduced, except in full, without written approval from PAL.
 PAL is accredited to ISO/IEC 17025:2017 Standard, by PJLA, Accreditation #64422, Testing.

Rick Jordan, Laboratory Manager