



# CERTIFICATE OF ANALYSIS

**Customer:** Root Bioscience - Morrisville, NC 27560

**Order #:** 701925  
**Batch #:** BS60002  
**Order Date:** 06/28/2019  
**Collection Date:** 06/28/2019  
**Report Date:** 07/24/2019

**Specimen Type:** Extract  
**Description:** Distillate and MCT Oil  
**Extracted From:** Hemp  
**Method:** SOP-3

**Initial Gross Weight:** 25664.00(mg)  
**Specimen Weight:** 106.04(mg)  
**Net Weight:** 28830(mg)  
**Density:** 0.9610(g/ml)

## Potency Details

										(HPLC)	
Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)
CBC		ND	0.001	CBCA		ND	0.001	CBD	22.478	2.339	0.001
CBDA	0.226	0.024	0.001	CBDV	0.414	0.043	0.001	CBDVA		ND	0.001
CBG	0.584	0.061	0.001	CBGA		ND	0.001	CBL		ND	0.001
CBN		ND	0.001	CBNA		ND	0.001	Delta-8-THC		ND	0.001
Delta-9-THC		ND	0.001	THCA-A		ND	0.001	THCV	0.150	0.016	0.001
THCVA		ND	0.001	Total CBD	22.676	2.360	0.001	Total THC		ND	0.001

## Potency Totals

Analyte	Result (mg)	(%)
<b>CBD Total</b>	<b>680.388</b>	<b>2.360</b>
<b>THC Total</b>	<b>ND</b>	<b>ND</b>
<b>CBG Total</b>	<b>17.586</b>	<b>0.061</b>
<b>CBN Total</b>	<b>ND</b>	<b>ND</b>
<b>Other Cannabinoids Total</b>	<b>17.010</b>	<b>0.059</b>
<b>Total Detected Cannabinoids</b>	<b>714.696</b>	<b>2.479</b>

Thomas Farrell, MD  
Lab Director

\* Total CBD = CBD + (CBD-A \* 0.877). Total THC = THCA-A \* 0.877 + Delta 9 THC, \*CBG Total = (CBGA \* 0.877) + CBG, \*CBN Total = (CBNA \* 0.877) + CBN, \*Other Cannabinoids Total = CBC + CBDV + THCV + THCVA, \*Total Detected Cannabinoids = CBD Total + CBG Total + CBN Total + THC Total + CBC + CBDV + THCV + THCVA, \*Total (mg) = Total (%) ÷ 100 \* Net Weight(mg), ND = <LOQ, T-Caryophyllene = Trans-Caryophyllene, <LOQ = Less Than Limit of Quantitation, QNS = Quantity Not Sufficient. (%) = Percent, (ppm) = Parts per Million, (ppb) = Parts per Billion, (µg/Kg) = Microgram per Kilogram, (mg/g) = Milligram per Gram, ppm = (µg/g), ppb = (µg/kg).

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 CLIA No. 10D1094068



# CERTIFICATE OF ANALYSIS



Customer: Root Bioscience - Morrisville, NC 27560

Order #: 708264  
Batch #: BS120002  
Order Date: 10/29/2019  
Collection Date: 10/29/2019  
Report Date: 11/04/2019

Specimen Type: Extract  
Description: Broad Spectrum 1200mg Tincture  
Extracted From: Hemp  
Method: SOP-3

Initial Gross Weight: 78394.00(mg)  
Specimen Weight: 96.29(mg)  
Density: 0.9876(g/ml)

## Potency - 11

(HPLC)

Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)
CBC		ND	0.001	CBD	45.558	4.613	0.001	CBDA		ND	0.001
CBDV	0.499	0.051	0.001	CBG	0.750	0.076	0.001	CBGA		ND	0.001
CBN		ND	0.001	Delta-8-THC		ND	0.001	Delta-9-THC		ND	0.001
THCA-A		ND	0.001	THCV	0.239	0.024	0.001	Total CBD	45.558	4.613	0.001
Total THC		ND	0.001								

## Pesticides ( Passed )

(LCMS/MS)

Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)	Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)	Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)
Abamectin	0.500	<LOQ	0.100	Acephate	0.400	<LOQ	0.100	Acequinocyl	2.000	<LOQ	0.750
Acetamiprid	0.200	<LOQ	0.100	Aldicarb	0.400	<LOQ	0.100	Azoxystrobin	0.200	<LOQ	0.100
Bifenazate	0.200	<LOQ	0.100	Bifenthrin	0.200	<LOQ	0.100	Boscalid	0.400	<LOQ	0.100
Carbaryl	0.200	<LOQ	0.100	Carbofuran	0.200	<LOQ	0.100	Chlorantraniliprole	0.200	<LOQ	0.100
Chlorpyrifos	0.200	<LOQ	0.100	Clofentazine	0.200	<LOQ	0.100	Cypermethrin	1.000	<LOQ	0.100
Daminozide	1.000	<LOQ	0.100	Diazinon	0.200	<LOQ	0.100	Dichlorvos	0.100	<LOQ	0.100
Dimethoate	0.200	<LOQ	0.100	Ethoprophos	0.200	<LOQ	0.100	Etofenprox	0.400	<LOQ	0.100
Etoxazole	0.200	<LOQ	0.100	Fenoxycarb	0.200	<LOQ	0.100	Fipronil	0.400	<LOQ	0.100
Flonicamid	1.000	<LOQ	0.100	Fludioxonil	0.400	<LOQ	0.100	Hexythiazox	1.000	<LOQ	0.100
Imazalil	0.200	<LOQ	0.100	Imidacloprid	0.400	<LOQ	0.100	Kresoxim Methvl	0.400	<LOQ	0.100
Malathion A	0.200	<LOQ	0.100	Metalaxyl	0.200	<LOQ	0.100	Methiocarb	0.200	<LOQ	0.100
Methomyl	0.400	<LOQ	0.100	MGK-264	0.200	<LOQ	0.100	Myclobutanil	0.200	<LOQ	0.100
Naled	0.500	<LOQ	0.100	Oxamyl	1.000	<LOQ	0.100	Paclbutrazol	0.400	<LOQ	0.100
Parathion-methyl	0.200	<LOQ	0.250	Permethrin	0.200	<LOQ	0.100	Phosmet	0.200	<LOQ	0.100
Piperonylbutoxide	2.000	<LOQ	0.100	Prallethrin	0.200	<LOQ	0.100	Propiconazole	0.400	<LOQ	0.100
Propoxur	0.200	<LOQ	0.100	Pyrethrins	1.000	<LOQ	0.100	Pyridaben	0.200	<LOQ	0.100
Spinosyn A	0.200	<LOQ	0.100	Spinosyn D	0.200	<LOQ	0.100	Spiromesifen	0.200	<LOQ	0.100
Spirotetramat	0.200	<LOQ	0.100	Spiroxamine	0.400	<LOQ	0.100	Tebuconazole	0.400	<LOQ	0.100
Thiacloprid	0.200	<LOQ	0.100	Thiamethoxam	0.200	<LOQ	0.100	Trifloxystrobin	0.200	<LOQ	0.100

Xueli Gao, Ph.D., DABT  
Lab Toxicologist

Aixia Sun, D.H.Sc., M.Sc., B.Sc., MT (AAB)  
Principal Scientist

\*\* Total CBD = CBD + (CBD-A \* 0.877). Total THC = THCA-A \* 0.877 + Delta 9 THC, ND = <LOQ, T-Caryophyllene = Trans-Caryophyllene, <LOQ = Less Than Limit of Quantitation, QNS = Quantity Not Sufficient. (%) = Percent, (ppm) = Parts per Million, (ppb) = Parts per Billion, (µg/Kg) = Microgram per Kilogram, (mg/g) = Milligram per Gram, ppm = (µg/g), ppb = (µg/kg).

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# CERTIFICATE OF ANALYSIS



Customer: Root Bioscience - Morrisville, NC 27560

<b>Order #:</b> 708264	<b>Specimen Type:</b> Extract	<b>Initial Gross Weight:</b> 78394.00(mg)
<b>Batch #:</b> BS120002	<b>Description:</b> Broad Spectrum 1200mg Tincture	<b>Specimen Weight:</b> 96.29(mg)
<b>Order Date:</b> 10/29/2019	<b>Extracted From:</b> Hemp	<b>Density:</b> 0.9876(g/ml)
<b>Collection Date:</b> 10/29/2019	<b>Method:</b> SOP-3	
<b>Report Date:</b> 11/04/2019		

### Residual Solvents ( Passed )

Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)	Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)	Analyte	Action Level (ppm)	Result (ppm)	LOQ (ppm)
Acetone	5,000.000	<LOQ	87.900	Benzene	1.600	<LOQ	1.600	Chloroform	53.000	<LOQ	53.000
Ethanol	5,000.000	<LOQ	26.700	Hexane	60.000	<LOQ	36.600	I-Butane	5,000.000	<LOQ	100.000
Isopropanol	5,000.000	<LOQ	52.300	Methanol	3,000.000	<LOQ	87.900	N-Butane	5,000.000	<LOQ	200.000
Pentane	5,000.000	<LOQ	389.500	Toluene	890.000	<LOQ	38.400				

### Heavy Metals ( Passed )

Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)	Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)	Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)
Arsenic (As)	500.000	<LOQ	100.000	Cadmium (Cd)	500.000	<LOQ	100.000	Lead (Pb)	500.000	<LOQ	100.000
Mercury (Hg)	500.000	<LOQ	100.000								

### Mycotoxins ( Passed )

Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)	Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)	Analyte	Action Level (ppb)	Result (ppb)	LOQ (ppb)
Aflatoxin B1		<LOQ	6.000	Aflatoxin B2		<LOQ	6.000	Aflatoxin G1		<LOQ	6.000
Aflatoxin G2		<LOQ	6.000	Aflatoxin Total	20.000	<LOQ	6.000	Ochratoxin A	20.000	<LOQ	12.000

### Moisture

Analyte	Result (%)
Moisture	0.820

### Pathogenic Microbiology ( Passed )

Analyte	Result (cfu/g)	Remark	Analyte	Result (cfu/g)	Remark	Analyte	Result (cfu/g)	Remark
Aspergillus Flavus	<1	Absence	Aspergillus Fumigatus	<1	Absence	Aspergillus Niger	<1	Absence
Aspergillus Terreus	<1	Absence	Salmonella	<1	Absence	STEC E. Coli	<1	Absence

### Water Activity ( Passed )

Analyte	Action Level (aw)	Result (aw)
Water Activity	0.850	0.410

### Filth and Foreign Material ( Passed )

Analyte	Action Level (area ratio)	Result (area ratio)	Analyte	Action Level (mg/Kg)	Result (mg/Kg)	Analyte	Action Level (%)	Result (%)
Covered Area	0.250	0.000	Feces	0.500	0.000	Weight %	5.000	0.000

Xueli Gao, Ph.D., DABT  
Lab Toxicologist

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Principal Scientist

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# CERTIFICATE OF ANALYSIS

**Customer:** Root Bioscience - Morrisville, NC 27560

**Order #:** 701927  
**Batch #:** BS240002  
**Order Date:** 06/28/2019  
**Collection Date:** 06/28/2019  
**Report Date:** 07/24/2019

**Specimen Type:** Extract  
**Description:** Distillate and MCT Oil  
**Extracted From:** Hemp  
**Method:** SOP-3

**Initial Gross Weight:** 26141.00(mg)  
**Specimen Weight:** 96.30(mg)  
**Net Weight:** 29043(mg)  
**Density:** 0.9681(g/ml)

## Potency Details

										(HPLC)	
Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)	Analyte	Result (mg/ml)	(%)	LOQ (%)
CBC		ND	0.001	CBCA		ND	0.001	CBD	86.451	8.930	0.001
CBDA	0.639	0.066	0.001	CBDV	1.306	0.135	0.001	CBDVA		ND	0.001
CBG	2.019	0.209	0.001	CBGA		ND	0.001	CBL		ND	0.001
CBN	0.112	0.012	0.001	CBNA		ND	0.001	Delta-8-THC		ND	0.001
Delta-9-THC		ND	0.001	THCA-A		ND	0.001	THCV	0.780	0.081	0.001
THCVA		ND	0.001	Total CBD	87.012	8.988	0.001	Total THC		ND	0.001

## Potency Totals

Analyte	Result (mg)	(%)
<b>CBD Total</b>	<b>2,610.385</b>	<b>8.988</b>
<b>THC Total</b>	<b>ND</b>	<b>ND</b>
<b>CBG Total</b>	<b>60.700</b>	<b>0.209</b>
<b>CBN Total</b>	<b>3.485</b>	<b>0.012</b>
<b>Other Cannabinoids Total</b>	<b>62.733</b>	<b>0.216</b>
<b>Total Detected Cannabinoids</b>	<b>2,736.722</b>	<b>9.423</b>

Thomas Farrell, MD  
Lab Director

\* Total CBD = CBD + (CBD-A \* 0.877). Total THC = THCA-A \* 0.877 + Delta 9 THC, \*CBG Total = (CBGA \* 0.877) + CBG, \*CBN Total = (CBNA \* 0.877) + CBN, \*Other Cannabinoids Total = CBC + CBDV + THCV + THCVA, \*Total Detected Cannabinoids = CBD Total + CBG Total + CBN Total + THC Total + CBC + CBDV + THCV + THCVA, \*Total (mg) = Total (%) ÷ 100 \* Net Weight(mg), ND = <LOQ, T-Caryophyllene = Trans-Caryophyllene, <LOQ = Less Than Limit of Quantitation, QNS = Quantity Not Sufficient. (%) = Percent, (ppm) = Parts per Million, (ppb) = Parts per Billion, (µg/Kg) = Microgram per Kilogram, (mg/g) = Milligram per Gram, ppm = (µg/g), ppb = (µg/kg).

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