Official Compliance: Colorado Hemp
CERTIFICATE OF ANALYSIS

DATE ISSUED 04/01/2023

SAMPLE NAME: R&R Organic Full Spectrum 5000mg Tincture - Unflavored

Infused, Colorado Infused

CULTIVATOR / MANUFACTURER

Business Name:
License Number:
Address:

DISTRIBUTOR / TESTED FOR

Business Name: R&R CBD
License Number:
Address:

SAMPLE DETAIL

Batch Number: Lot 7701
Sample ID: 230309R016
Date of Sampling: 03/09/2023
Time of Sampling: 3:31 p.m.
Sampler Name:
Sampler Company:

Date Collected: 03/09/2023
Date Received: 03/10/2023
Batch Size:
Sample Size: 1.0 units
Unit Mass: 30 milliliters per Unit
Serving Size: 1 milliliters per Serving

Scan QR code to verify authenticity of results.

CANNABINOID ANALYSIS - SUMMARY

Total THC: 82.770 mg/unit

Total CBD: 5432.130 mg/unit

Sum of Cannabinoids: 5949.240 mg/unit

Total Cannabinoids: 5939.100 mg/unit

Total THC/CBD is calculated using the following formulas to take into account the loss of a carboxyl group during the decarboxylation step:
Total THC = Δ^9-THC + (THCa (0.877))
Total CBD = CBD + (CBDa (0.877))
Sum of Cannabinoids = Δ^9-THC + THCa + CBD + CBDa + CBG + CBGa + THCV + THCVa + CBC + CBCa + CBDV + CBDVa + Δ^8-THC + CBL + CBN
Total Cannabinoids = (Δ^9-THC+0.877*THCa) + (CBD+0.877*CBDa) + (CBG+0.877*CBGa) + (THCV+0.877*THCVa) + (CBC+0.877*CBCa) + (CBDV+0.877*CBDVa) + Δ^8-THC + CBL + CBN

Density: 0.9648 g/mL

TERPENOID ANALYSIS - SUMMARY

39 TESTED, TOP 3 HIGHLIGHTED

Total Terpenoids: 0.1071%

- α-Bisabolol 0.709 mg/g
- Guaiol 0.362 mg/g
- Nerolidol <LOQ

SAFETY ANALYSIS - SUMMARY

Pesticides: ND

Mycotoxins: PASS

Residual Solvents: ND

Heavy Metals: PASS

Microbiology (PCR): PASS

Microbiology (Plating): PASS

These results relate only to the sample included on this report.
This report shall not be reproduced, except in full, without written approval of the laboratory.

Sample Certification: 6 CCR 1010-21 Colorado Wholesale Food, Industrial Hemp, and Shellfish Regulations; where applicable

Decision Rule: Statements of conformity (e.g. Pass/Fail) to specifications are made in this report without taking measurement uncertainty into account. Where statements of conformity are made in this report, the following decision rules are applied: PASS - Results within limits/specifications, FAIL - Results exceed limits/specifications.

References: limit of detection (LOD), limit of quantification (LOQ), not detected (ND), not tested (NT), too numerous to count >250 cfu/plate (TNTC), colony-forming unit (cfu)

LQC verified by: Mackenzie Whitman
Job Title: Laboratory Director
Date: 04/01/2023

Approved by: Josh Wurzer
Job Title: Chief Compliance Officer
Date: 04/01/2023

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Cannabinoid Analysis

Tested by high-performance liquid chromatography with diode-array detection (HPLC-DAD).

Method: QSP 1157 - Analysis of Cannabinoids by HPLC-DAD

TOTAL THC: 82.770 mg/unit

Total THC (Δ^9-THC+0.877*THCa)

TOTAL CBD: 5432.130 mg/unit

Total CBD (CBD+0.877*CBDa)

TOTAL CANNABINOIDS: 5939.100 mg/unit

Total Cannabinoids (Total THC) + (Total CBD) + (Total CBG) + (Total THCV) + (Total CBC) + (Total CBDV) + Δ^8-THC + CBL + CBN

TOTAL CBG: 94.620 mg/unit

Total CBG (CBG+0.877*CBGa)

TOTAL THCV: ND

Total THCV (THCV+0.877*THCVa)

TOTAL CBC: 163.470 mg/unit

Total CBC (CBC+0.877*CBCa)

TOTAL CBDV: 65.370 mg/unit

Total CBDV (CBDV+0.877*CBDVa)

CANNABINOID TEST RESULTS - 03/31/2023

COMPOUND	LOD/LOQ (mg/mL)	MEASUREMENT UNCERTAINTY (mg/mL)	RESULT (mg/mL)	RESULT (%)
CBD	*0.004 / 0.011*	*±6.6658*	178.707	18.5227
CBC	*0.003 / 0.010*	*±0.1739*	5.400	0.5597
CBG	*0.002 / 0.006*	*±0.1530*	3.154	0.3269
CBN	*0.001 / 0.007*	*±0.0826*	2.879	0.2984
Δ^9-THC	*0.002 / 0.014*	*±0.1515*	2.759	0.2860
CBDa	*0.001 / 0.026*	*±0.0765*	2.695	0.2793
CBDV	*0.002 / 0.012*	*±0.0889*	2.179	0.2258
CBL	*0.003 / 0.010*	*±0.0177*	0.479	0.0496
CBCa	*0.001 / 0.015*	*±0.0021*	0.056	0.0058
Δ^8-THC	*0.01 / 0.02*	*N/A*	ND	ND
THCa	*0.001 / 0.005*	*N/A*	ND	ND
THCV	*0.002 / 0.012*	*N/A*	ND	ND
THCVa	*0.002 / 0.019*	*N/A*	ND	ND
CBDVa	*0.001 / 0.018*	*N/A*	ND	ND
CBGa	*0.002 / 0.007*	*N/A*	ND	ND
Total THC		*±0.1515*	2.759	0.2860
SUM OF CANNABINOIDS			198.308 mg/mL	20.5543%

Unit Mass: 30 milliliters per Unit / Serving Size: 1 milliliters per Serving

Δ^9-THC per Unit	82.770 mg/unit
Δ^9-THC per Serving	2.759 mg/serving
Total THC per Unit	82.770 mg/unit
Total THC per Serving	2.759 mg/serving
CBD per Unit	5361.210 mg/unit
CBD per Serving	178.707 mg/serving
Total CBD per Unit	5432.130 mg/unit
Total CBD per Serving	181.071 mg/serving
Sum of Cannabinoids per Unit	5949.240 mg/unit
Sum of Cannabinoids per Serving	198.308 mg/serving
Total Cannabinoids per Unit	5939.100 mg/unit
Total Cannabinoids per Serving	197.970 mg/serving

DENSITY TEST RESULT

0.9648 g/mL

Tested 03/31/2023

Method: QSP 7870 - Sample Preparation

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Terpenoid Analysis

Terpene analysis utilizing gas chromatography-flame ionization detection (GC-FID).

Method: QSP 1192 - Analysis of Terpenoids by GC-FID

1 α-Bisabolol
A sesquiterpene alcohol with a fragrance that can be described as floral, peppery, sweet and clean. Found in chamomile, figwort, yarrow, skullcaps, lavender, ironwort, germander...etc.

2 Guaiol
A sesquiterpene alcohol with a fragrance that can be described as floral, piney, herbal and woody. Found in guaiacum, cypress pine, ginseng, melaleuca, goatweed, incense grass...etc.

3 Nerolidol
A sesquiterpene alcohol with a fragrance that can be described as floral, citrusy, waxy, herbal and woody. Found in bitter orange, ginger, lavender, jasmine, tea tree, lemongrass, lady of the night...etc.

TERPENOID TEST RESULTS - 03/17/2023

COMPOUND	LOD/LOQ (mg/g)	MEASUREMENT UNCERTAINTY (mg/g)	RESULT (mg/g)	RESULT (%)
α-Bisabolol	0.008 / 0.026	±0.0294	0.709	0.0709
Guaiol	0.009 / 0.030	±0.0133	0.362	0.0362
Nerolidol	0.006 / 0.019	N/A	<LOQ	<LOQ
Caryophyllene Oxide	0.010 / 0.033	N/A	<LOQ	<LOQ
α-Pinene	0.005 / 0.017	N/A	ND	ND
Camphene	0.005 / 0.015	N/A	ND	ND
Sabinene	0.004 / 0.014	N/A	ND	ND
β-Pinene	0.004 / 0.014	N/A	ND	ND
Myrcene	0.008 / 0.025	N/A	ND	ND
α-Phellandrene	0.006 / 0.020	N/A	ND	ND
Δ^3-Carene	0.005 / 0.018	N/A	ND	ND
α-Terpinene	0.005 / 0.017	N/A	ND	ND
p-Cymene	0.005 / 0.016	N/A	ND	ND
Limonene	0.005 / 0.016	N/A	ND	ND
Eucalyptol	0.006 / 0.018	N/A	ND	ND
β-Ocimene	0.006 / 0.020	N/A	ND	ND
γ-Terpinene	0.006 / 0.018	N/A	ND	ND
Sabinene Hydrate	0.006 / 0.022	N/A	ND	ND
Fenchone	0.009 / 0.028	N/A	ND	ND
Terpinolene	0.008 / 0.026	N/A	ND	ND
Linalool	0.009 / 0.032	N/A	ND	ND
Fenchol	0.010 / 0.034	N/A	ND	ND
Isopulegol	0.005 / 0.016	N/A	ND	ND
Camphor	0.006 / 0.019	N/A	ND	ND
Isoborneol	0.004 / 0.012	N/A	ND	ND
Borneol	0.005 / 0.016	N/A	ND	ND
Menthol	0.008 / 0.025	N/A	ND	ND
Terpineol	0.009 / 0.031	N/A	ND	ND
Nerol	0.003 / 0.011	N/A	ND	ND
Citronellol	0.003 / 0.010	N/A	ND	ND
Pulegone	0.003 / 0.011	N/A	ND	ND
Geraniol	0.002 / 0.007	N/A	ND	ND
Geranyl Acetate	0.004 / 0.014	N/A	ND	ND
α-Cedrene	0.005 / 0.016	N/A	ND	ND
β-Caryophyllene	0.004 / 0.012	N/A	ND	ND
trans-β-Farnesene	0.008 / 0.025	N/A	ND	ND
α-Humulene	0.009 / 0.029	N/A	ND	ND
Valencene	0.009 / 0.030	N/A	ND	ND
Cedrol	0.008 / 0.027	N/A	ND	ND
TOTAL TERPENOIDS			1.071 mg/g	0.1071%

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Pesticide Analysis

Pesticide and plant growth regulator analysis utilizing high-performance liquid chromatography-mass spectrometry (HPLC-MS) or gas chromatography-mass spectrometry (GC-MS).

*GC-MS utilized where indicated.

Method: QSP 1212 - Analysis of Pesticides and Mycotoxins by LC-MS or QSP 1213 - Analysis of Pesticides by GC-MS

PESTICIDE TEST RESULTS - 03/31/2023 **ND**

COMPOUND	LOD/LOQ (µg/g)	MEASUREMENT UNCERTAINTY (µg/g)	RESULT (µg/g)
Abamectin	0.032 / 0.097	N/A	ND
Acephate	0.006 / 0.018	N/A	ND
Acequinocyl	0.009 / 0.027	N/A	ND
Acetamiprid	0.016 / 0.049	N/A	ND
Aldicarb	0.030 / 0.090	N/A	ND
Allethrin	0.030 / 0.092	N/A	ND
Atrazine	0.006 / 0.019	N/A	ND
Azadirachtin	0.082 / 0.248	N/A	ND
Azoxystrobin	0.003 / 0.009	N/A	ND
Benzovindiflupyr	0.003 / 0.009	N/A	ND
Bifenazate	0.003 / 0.009	N/A	ND
Bifenthrin	0.021 / 0.064	N/A	ND
Boscalid	0.003 / 0.009	N/A	ND
Buprofezin	0.006 / 0.019	N/A	ND
Carbaryl	0.007 / 0.020	N/A	ND
Carbofuran	0.003 / 0.008	N/A	ND
Chlorantraniliprole	0.006 / 0.018	N/A	ND
Chlorfenapyr*	0.005 / 0.015	N/A	ND
Chlorpyrifos	0.013 / 0.039	N/A	ND
Clofentezine	0.003 / 0.009	N/A	ND
Clothianidin	0.008 / 0.025	N/A	ND
Coumaphos	0.003 / 0.010	N/A	ND
Cyantraniliprole	0.003 / 0.010	N/A	ND
Cyfluthrin	0.052 / 0.159	N/A	ND
Cypermethrin	0.051 / 0.153	N/A	ND
Cyprodinil	0.003 / 0.008	N/A	ND
Daminozide	0.026 / 0.077	N/A	ND
Deltamethrin	0.059 / 0.180	N/A	ND
Diazinon	0.006 / 0.017	N/A	ND
Dichlorvos (DDVP)	0.012 / 0.038	N/A	ND
Dimethoate	0.003 / 0.009	N/A	ND
Dimethomorph	0.016 / 0.050	N/A	ND
Dinotefuran	0.010 / 0.030	N/A	ND
Diuron	0.013 / 0.040	N/A	ND
Dodemorph	0.012 / 0.035	N/A	ND
Endosulfan sulfate	0.016 / 0.048	N/A	ND
Endosulfan-α*	0.004 / 0.014	N/A	ND
Endosulfan-β*	0.006 / 0.019	N/A	ND
Ethoprophos	0.003 / 0.009	N/A	ND
Etofenprox	0.014 / 0.042	N/A	ND
Etoxazole	0.007 / 0.020	N/A	ND

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Pesticide Analysis *Continued*

PESTICIDE TEST RESULTS - 03/31/2023 *continued* **ND**

COMPOUND	LOD/LOQ (µg/g)	MEASUREMENT UNCERTAINTY (µg/g)	RESULT (µg/g)
Etridiazole*	0.002 / 0.005	N/A	ND
Fenhexamid	0.003 / 0.008	N/A	ND
Fenoxycarb	0.003 / 0.010	N/A	ND
Fenpyroximate	0.007 / 0.020	N/A	ND
Fensulfothion	0.003 / 0.010	N/A	ND
Fenthion	0.003 / 0.010	N/A	ND
Fenvalerate	0.033 / 0.099	N/A	ND
Fipronil	0.003 / 0.010	N/A	ND
Flonicamid	0.007 / 0.022	N/A	ND
Fludioxonil	0.003 / 0.010	N/A	ND
Fluopyram	0.003 / 0.009	N/A	ND
Hexythiazox	0.003 / 0.010	N/A	ND
Imazalil	0.003 / 0.009	N/A	ND
Imidacloprid	0.003 / 0.010	N/A	ND
Iprodione	0.077 / 0.233	N/A	ND
Kinoprene	0.077 / 0.233	N/A	ND
Kresoxim-methyl	0.006 / 0.019	N/A	ND
λ-Cyhalothrin	0.068 / 0.206	N/A	ND
Malathion	0.003 / 0.009	N/A	ND
Metalaxyl	0.003 / 0.010	N/A	ND
Methiocarb	0.003 / 0.008	N/A	ND
Methomyl	0.008 / 0.025	N/A	ND
Methoprene	0.172 / 0.521	N/A	ND
Mevinphos	0.008 / 0.024	N/A	ND
MGK-264	0.015 / 0.047	N/A	ND
Myclobutanil	0.003 / 0.009	N/A	ND
Naled	0.021 / 0.064	N/A	ND
Novaluron	0.002 / 0.005	N/A	ND
Oxamyl	0.017 / 0.051	N/A	ND
Paclobutrazol	0.003 / 0.010	N/A	ND
Parathion-methyl	0.016 / 0.050	N/A	ND
Pentachloronitrobenzene*	0.004 / 0.012	N/A	ND
Permethrin	0.056 / 0.168	N/A	ND
Phenothrin	0.016 / 0.047	N/A	ND
Phosmet	0.007 / 0.020	N/A	ND
Piperonyl Butoxide	0.010 / 0.029	N/A	ND
Pirimicarb	0.003 / 0.009	N/A	ND
Prallethrin	0.015 / 0.046	N/A	ND
Propiconazole	0.027 / 0.080	N/A	ND
Propoxur	0.003 / 0.008	N/A	ND
Pyraclostrobin	0.003 / 0.010	N/A	ND

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Pesticide Analysis *Continued*

PESTICIDE TEST RESULTS - 03/31/2023 *continued* **ND**

COMPOUND	LOD/LOQ (µg/g)	MEASUREMENT UNCERTAINTY (µg/g)	RESULT (µg/g)
Pyrethrins	*0.016 / 0.049*	*N/A*	ND
Pyridaben	*0.005 / 0.017*	*N/A*	ND
Pyriproxyfen	*0.003 / 0.009*	*N/A*	ND
Resmethrin	*0.013 / 0.039*	*N/A*	ND
Spinetoram	*0.003 / 0.010*	*N/A*	ND
Spinosad	*0.003 / 0.010*	*N/A*	ND
Spirodiclofen	*0.031 / 0.093*	*N/A*	ND
Spiromesifen	*0.016 / 0.050*	*N/A*	ND
Spirotetramat	*0.003 / 0.010*	*N/A*	ND
Spiroxamine	*0.020 / 0.062*	*N/A*	ND
Tebuconazole	*0.003 / 0.010*	*N/A*	ND
Tebufenozide	*0.003 / 0.008*	*N/A*	ND
Teflubenzuron	*0.007 / 0.022*	*N/A*	ND
Tetrachlorvinphos	*0.003 / 0.008*	*N/A*	ND
Tetramethrin	*0.021 / 0.063*	*N/A*	ND
Thiabendazole	*0.006 / 0.020*	*N/A*	ND
Thiacloprid	*0.003 / 0.009*	*N/A*	ND
Thiamethoxam	*0.003 / 0.010*	*N/A*	ND
Thiophanate-methyl	*0.013 / 0.040*	*N/A*	ND
Trifloxystrobin	*0.003 / 0.009*	*N/A*	ND

Mycotoxin Analysis

Mycotoxin analysis utilizing high-performance liquid chromatography-mass spectrometry (HPLC-MS).

Method: QSP 1212 - Analysis of Pesticides and Mycotoxins by LC-MS

MYCOTOXIN TEST RESULTS - 03/15/2023 PASS

COMPOUND	LOD/LOQ (µg/kg)	ACTION LIMIT (µg/kg)	MEASUREMENT UNCERTAINTY (µg/kg)	RESULT (µg/kg)	RESULT
Aflatoxin B1	*1.6 / 5.0*	*5*	*N/A*	ND	PASS
Aflatoxin B2	*1.4 / 4.1*		*N/A*	ND	
Aflatoxin G1	*1.6 / 4.9*		*N/A*	ND	
Aflatoxin G2	*1.6 / 5.0*		*N/A*	ND	
Total Aflatoxin		*20*		ND	PASS
Ochratoxin A	*1.6 / 5.0*	*5*	*N/A*	ND	PASS

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Residual Solvents Analysis

Residual Solvent analysis utilizing gas chromatography-mass spectrometry (GC-MS).

Method: QSP 1204 - Analysis of Residual Solvents by GC-MS

Total Butanes = n-Butane + 2-Methylpropane (Isobutane)
Total Heptanes = 2,2-Dimethylpentane (Neoheptane) + 2,3-Dimethylpentane + 2,4-Dimethylpentane + 3,3-Dimethylpentane + 2,2,3-Trimethylbutane (Triptane) + 2-Methylhexane (Isoheptane) + 3-Methylhexane + 3-Ethylpentane + n-Heptane
Total Xylenes = 1,2-Dimethylbenzene (o-Xylene) + 1,3-Dimethylbenzene (m-Xylene) / 1,4-Dimethylbenzene (p-Xylene)

Exclusions[1] see last page

RESIDUAL SOLVENTS TEST RESULTS - 03/31/2023 **ND**

COMPOUND	LOD/LOQ (µg/g)	MEASUREMENT UNCERTAINTY (µg/g)	RESULT (µg/g)
Propane	0.234 / 0.781	N/A	ND
2-Methylpropane (Isobutane)	0.052 / 0.173	N/A	ND
n-Butane	0.019 / 0.063	N/A	ND
Total Butanes			ND
n-Pentane	0.310 / 1.033	N/A	ND
n-Hexane	0.110 / 0.366	N/A	ND
2,2-Dimethylpentane (Neoheptane)	0.493 / 1.642	N/A	ND
2,3-Dimethylpentane	1.009 / 3.365	N/A	ND
2,4-Dimethylpentane	0.737 / 2.458	N/A	ND
3,3-Dimethylpentane	0.198 / 0.660	N/A	ND
2,2,3-Trimethylbutane (Triptane)	0.521 / 1.738	N/A	ND
2-Methylhexane (Isoheptane)	0.610 / 2.034	N/A	ND
3-Methylhexane	0.235 / 0.785	N/A	ND
3-Ethylpentane	0.304 / 1.012	N/A	ND
n-Heptane	13.12 / 43.72	N/A	ND
Total Heptanes			ND
Benzene	0.089 / 0.295	N/A	ND
Toluene	0.115 / 0.382	N/A	ND
1,3-Dimethylbenzene / 1,4-Dimethylbenzene	0.451 / 1.502	N/A	ND
1,2-Dimethylbenzene (o-Xylene)	0.387 / 1.289	N/A	ND
Total Xylenes			ND
Methanol	5.534 / 16.77	N/A	ND
Ethanol	8.984 / 27.23	N/A	ND
2-Propanol (Isopropyl Alcohol)	8.421 / 25.52	N/A	ND
Acetone	9.510 / 28.82	N/A	ND
Ethyl Acetate	1.123 / 3.745	N/A	ND

Heavy Metals Analysis

Heavy metal analysis utilizing inductively coupled plasma-mass spectrometry (ICP-MS).

Method: QSP 1160 - Analysis of Heavy Metals by ICP-MS

HEAVY METALS TEST RESULTS - 03/12/2023 PASS

COMPOUND	LOD/LOQ (µg/g)	ACTION LIMIT (µg/g)	MEASUREMENT UNCERTAINTY (µg/g)	RESULT (µg/g)	RESULT
Arsenic	0.02 / 0.1	1.5	N/A	ND	PASS
Cadmium	0.02 / 0.05	0.5	N/A	ND	PASS
Lead	0.04 / 0.1	0.5	N/A	ND	PASS
Mercury	0.002 / 0.01	1.5	N/A	ND	PASS

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Microbiology Analysis

PCR AND PLATING

Analysis conducted by polymerase chain reaction (PCR) and fluorescence detection of microbiological contaminants.

Method: QSP 1221 - Analysis of Microbiological Contaminants

MICROBIOLOGY TEST RESULTS (PCR) - 03/14/2023 PASS

COMPOUND	ACTION LIMIT	RESULT	RESULT
Shiga toxin-producing *Escherichia coli*	*Not Detected in 25g*	ND	PASS
Salmonella spp.	*Not Detected in 25g*	ND	PASS

Analysis conducted by 3M™ Petrifilm™ and plate counts of microbiological contaminants.

Method: QSP 6794 - Plating with 3M™ Petrifilm™

MICROBIOLOGY TEST RESULTS (PLATING) - 03/14/2023 PASS

COMPOUND	ACTION LIMIT (cfu/g)	RESULT (cfu/g)	RESULT
Total Aerobic Bacteria	*10000*	ND	PASS
Total Yeast and Mold	*1000*	ND	PASS
Coliforms	*100*	ND	PASS

NOTES

COA amended, update to results.

1. Exclusions: LOD of 53.9 ug/g applied to methanol, LOD of 10.6 ug/g applied to acetone.

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