



STRAIGHT HEMP

CERTIFICATE OF ANALYSIS

PRODUCT: Straight Hemp Vape Oil PRODUCTION DATE: 07/2020
BATCH/LOT: VA011 BEST BY/EXP DATE: 07/2022
INGREDIENTS: Full Spectrum Hemp Extract, Terpene Blend (Hemp-derived)
ADDITIVES: none
EXCIPIENTS: none

TEST	METHOD	SPECIFICATION	RESULTS
Strength & Composition			
Total Cannabidiol (CBD) ⁱ	UPLC/UV	48 – 58%	51.7%
Total minor cannabinoids	UPLC/UV	n/e	5.43%
Total Tetrahydrocannabinol (THC) ⁱⁱ	UPLC/UV	NMT 0.3%	0.0675%
Total Cannabinoids	UPLC/UV	n/e	57.2%
Terpene assay ⁱⁱⁱ	HS-GC/MS	n/e	23.0%
Microbiological^{iv}			
Total Plate Count	USP 42	NMT 1,000 cfu/g	PASS
Total Coliforms	USP 42	NMT 100 cfu/g	PASS
Total Yeast & Mold	USP 42	NMT 100 cfu/g	PASS
<i>E. coli</i>	USP 42	Absent	PASS
<i>Salmonella</i>	USP 42	Absent	PASS
Heavy Metals^v			
Arsenic (As)	ICP/MS	NMT 0.2 ppm	PASS
Cadmium (Cd)	ICP/MS	NMT 0.2 ppm	PASS
Lead (Pb)	ICP/MS	NMT 0.5 ppm	PASS
Mercury (Hg)	ICP/MS	NMT 0.1 ppm	PASS
Residual Solvents			
Multi-residue panel	GC-HS-MSD	Below CCR Limits ^{vi}	PASS
Pesticides			
Multi-residue panel	UPLC-MS/MS	Below MRL ^{vii}	PASS


David Cole
Director of Quality


Date

ⁱ Total CBD = CBD + (0.877*CBDA) to account for loss of acid group during decarboxylation
ⁱⁱ Total THC = THC + (0.877*THCa) to account for loss of acid group during decarboxylation
ⁱⁱⁱ Sum of terpene assay (n=22)
^{iv} Microbiological limits based on USP, WHO, and/or NSF/ANSI.
^v Limits for As and Pb set below CA Prop 65 *no significant risk level*; Cd and Hg set below USP permitted daily exposure for 110lb body weight. Complies with 1 CCR 212-3
^{vi} 11 solvent panel: Propane, Isobutane, Butane, Methanol, Pentane, Ethanol, Acetone, Isopropanol, Acetonitrile, Hexane, Heptane. Individual limits: 1 CCR 212-3
^{vii} 18 residue panel

NMT = Not More Than
MRL = Method Reporting Limit
n/e = not established

Certificate ID: **84237**

 Received: **7/10/20**

Scan QR Code for authenticity


Natural Dynamics dba Straight Hemp

 Client Sample ID: **Vape Oil**
5135 W 58th Ave, Ste 5

 Lot Number: **VA011**
Arvada, CO 80002

 Matrix: **Vape Oil - Purified Terpenes**
Attn: David Cole

Authorization:

Chris Hudalla, Chief Science Officer

Signature:



Date:

7/21/2020



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: *JFD*

 Test Date: *7/17/2020*

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.

84237-CN

ID	Weight %	Concentration (mg/mL)			
D9-THC	0.0675	0.631			
THCV	ND	ND			
CBD	51.7	484			
CBDV	1.50	14.0			
CBG	3.82	35.7			
CBC	0.0723	0.676			
CBN	ND	ND			
THCA	ND	ND			
CBDA	ND	ND			
CBGA	ND	ND			
D8-THC	ND	ND			
exo-THC	ND	ND			
Total	57.2	535	0%	Cannabinoids (wt%)	51.7%
Max THC	0.0675	0.631			
Max CBD	51.7	484			

Limit of Quantitation (LOQ) = 0.0112 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 (LOD), which is one third of LOQ.

HM: Heavy Metal Analysis [WI-10-13]

Analyst: CJS

Test Date: 7/16/2020

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.

84237-HM

Symbol	Metal	Conc. ¹ (µg/kg)	RL	Use Limits ² (µg/kg)		Status
				All	Ingestion	
As	Arsenic	ND	50.0	200	1,500	PASS
Cd	Cadmium	ND	50.0	200	500	PASS
Hg	Mercury	ND	50.0	100	1,500	PASS
Pb	Lead	ND	50.0	500	1,000	PASS

1) ND = None detected to Lowest Limits of Detection (LLD)

2) MA Dept. of Public Health: Protocol for MMJ and MIPS, Exhibit 4(a) for all products.

3) USP exposure limits based on daily oral dosing of 1g of concentrate for a 110 lb person.

MB1: Microbiological Contaminants [WI-10-09]

Analyst: MM

Test Date: 7/10/2020

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.

84237-MB1

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

Recommended limits established by the American Herbal Pharmacopoeia (AHP) monograph for Cannabis Inflorescence [2013], for consumable botanical products, including processed and unprocessed cannabis materials, and solvent-based extracts. Note: All recorded Microbiological tests are within the established limits.

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

Analyst: LabAdmin

Test Date: 7/11/2020

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.

84237-MB2

Test ID	Analysis	Results	Units	Limits*	Status
84237-ECPT	E. coli (O157)	Negative	NA	Non Detected	PASS
84237-SPT	Salmonella	Negative	NA	Non Detected	PASS

Note: All recorded pathogenic bacteria tests passed.

PST: Pesticide Analysis [WI-10-11]

Analyst: CJR

Test Date: 7/17/2020

The client sample was analyzed for pesticides using Liquid Chromatography with Mass Spectrometric detection (LC/MS/MS). The method used for sample prep was based on the European method for pesticide analysis (EN 15662).

84237-PST

Analyte	CAS	Result	Units	LLD	Limits (ppb)	Status
Abamectin	71751-41-2	ND	ppb	0.20	300	PASS
Spinosad	168316-95-8	ND	ppb	0.10	3000	PASS
Pyrethrin	8003-34-7	ND	ppb	0.10	1000	PASS
Trifloxystrobin	141517-21-7	ND	ppb	0.10	30000	PASS
Spirotetramat	203313-25-1	ND	ppb	0.10	13000	PASS
Spiromesifen	283594-90-1	ND	ppb	0.10	12000	PASS
Piperonyl butoxide	51-03-6	ND	ppb	0.10	8000	PASS
Paclbutrazol	76738-62-0	ND	ppb	0.10	10	PASS
Myclobutanil	88671-89-0	ND	ppb	0.10	9000	PASS
Imidacloprid	138261-41-3	ND	ppb	0.10	3000	PASS
Imazalil	35554-44-0	ND	ppb	0.10	10	PASS
Fenoxycarb	72490-01-8	ND	ppb	0.10	10	PASS
Etoazole	153233-91-1	ND	ppb	0.10	1500	PASS
Dichlorvos	62-73-7	ND	ppb	3.00	10	PASS
Cyfluthrin	68359-37-5	ND	ppb	0.50	1000	PASS
Bifenthrin	82657-04-3	ND	ppb	0.20	500	PASS
Bifenazate	149877-41-8	ND	ppb	0.10	5000	PASS
Azoxystrobin	131860-33-8	ND	ppb	0.10	40000	PASS

* Testing limits for ingestion established by the State of California: CCR, Title 16, Division 42, Chapter 5, Section 5313. ND indicates "none detected" above the lower limit of detection (LLD). Analytes marked with (*) indicate analytes for which no recovery was observed for a pre-spiked matrix sample.

TP: Terpenes Profile [WI-10-27]

Analyst: CA

Test Date: 7/15/2020

Client sample analysis was performed using full evaporative technique (FET) headspace sample delivery and gas chromatographic (GC) compound separation. A combination of flame ionization detection (FID) and/or mass spectrometric (MS) detection with mass spectral confirmation against the National Institute of Standards and Technology (NIST) Mass Spectral Database, Revision 2017 were used. Chromatographic and/or mass spectral data were processed by quantitatively comparing the analytical peak areas against calibration curves prepared from certified reference standards.

84237-TP

Compound	CAS	Conc. (wt%)	Conc. (ppm)	Qualitative Profile
alpha-pinene	80-56-8	3.77	37,700	
camphene	79-92-5	0.126	1,260	
sabinene*	3387-41-5	ND	ND	
beta-myrcene	123-35-3	9.97	99,700	
beta-pinene	127-91-3	0.985	9,850	
alpha-phellandrene	99-83-2	ND	ND	
delta-3-carene	13466-78-9	ND	ND	
alpha-terpinene	99-86-5	0.0521	521	
alpha-ocimene	502-99-8	0.0251	251	
D-limonene	138-86-3	3.25	32,500	
p-cymene	99-87-6	ND	ND	
cis-beta-ocimene	3338-55-4	0.342	3,420	
eucalyptol	470-82-6	0.602	6,020	
gamma-terpinene	99-85-4	0.0911	911	
terpinolene	586-62-9	0.360	3,600	
linalool	78-70-6	0.306	3,060	
L-fenchone*	7787-20-4	ND	ND	
isopulegol	89-79-2	0.0013	13.2	
menthol*	89-78-1	ND	ND	
geraniol	106-24-1	ND	ND	
beta-caryophyllene	87-44-5	2.35	23,500	
alpha-humulene	6753-98-6	0.731	7,310	
cis-nerolidol	3790-78-1	ND	ND	
trans-nerolidol	40716-66-3	ND	ND	
guaiol	489-86-1	0.0149	149	
caryophyllene oxide	1139-30-6	0.0233	233	
alpha-bisabolol	23089-26-1	0.0094	93.8	

Total Terpene: 23.0 wt%

* Certified reference standard not available for this compound. Concentration is estimated using the response factor from alpha-pinene. ND = None Detected. RL = Reporting Limit of 5 ppm.

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

Analyst: CA

Test Date: 7/14/2020

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.

84237-VC

Compound	CAS	Amount ¹	Limit ²	RL	Status
Propane	74-98-6	ND	1,000 ppm	100	PASS
Isobutane	75-28-5	ND	1,000 ppm	100	PASS
Butane	106-97-8	ND	1,000 ppm	100	PASS
Methanol	67-56-1	ND	3,000 ppm	100	PASS
Pentane	109-66-0	ND	5,000 ppm	100	PASS
Ethanol	64-17-5	ND	5,000 ppm	100	PASS
Acetone	67-64-1	ND	5,000 ppm	100	PASS
Isopropanol	67-63-0	ND	5,000 ppm	100	PASS
Acetonitrile	75-05-8	ND	410 ppm	100	PASS
Hexane	110-54-3	ND	290 ppm	100	PASS
Heptane	142-82-5	ND	5,000 ppm	100	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 for cannabis concentrates and extracts on 3/31/16. Butane/Propane limits are based on limits established for state of Colorado.

(*) For ethanol, as many formulations contain flavorings based on ethanol extracts of natural products, no status has been assigned.

END OF REPORT