

CERTIFICATE OF ANALYSIS

Order Type: Medical Cannabis
Order ID: OR2019-2654

Customer ID: 746
Customer Name: Helix Extracts

Harvest/Extract Lot: None
Harvest/Extract Batch: None

Cultivar (Strain): Oil
Sample Date: 07/26/2019

Lab ID: SA2019-8594
Date Received: 07/29/2019

Sample Matrix: Concentrate
Date Completed: 08/01/2019

Remarks:

CANNABINOID (POTENCY) PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: HPLC/DAD (Internal Method-001)
Instrument: Agilent 1100

Moisture Content (%): -
Water Activity (aw): -

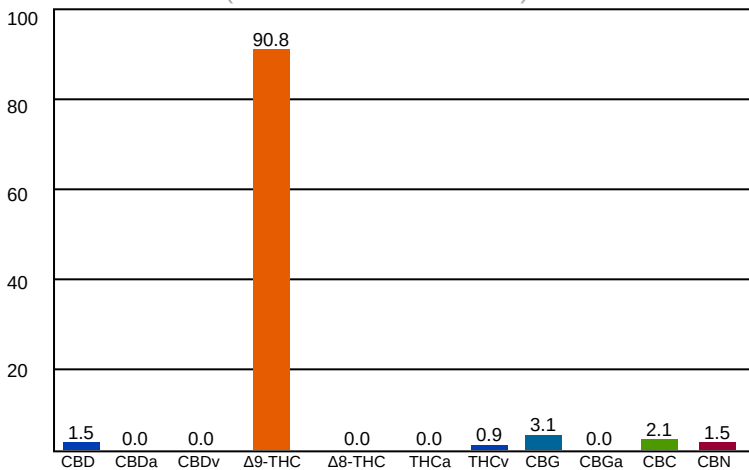
Cannabinoid	Result (%)	Result (mg/g)	Reporting Limit (mg/g)	Result (mg/mL)	Per Unit (mg)
CBD	1.47	14.7	0.326	-	15
CBDa	-	-	0.326	-	-
CBDv	-	-	0.326	-	-
Δ9-THC	90	900	0.326	-	900
Δ8-THC	-	-	0.326	-	-
THCa	-	-	0.326	-	-
THCv	0.935	9.35	0.326	-	9
CBC	2.09	20.9	0.326	-	21
CBG	3.12	31.2	0.326	-	31
CBGa	-	-	0.326	-	-
CBN	1.51	15.1	0.326	-	15
TOTAL	99.1	991			991
TOTAL THC	90	900			900
TOTAL CBD	1.47	15			15



UNIT MASS (g): 1

"-" Not detected above RL.

Cannabinoid Distribution
(% of Total Cannabinoids)



Deviations from standard operating procedure: None

Recoveries for all analyte standards: 90-110%
Replicate Uncertainties: <5% RSD, <20% RPD
Sample/Reagent Blanks: <RL for all analytes

Values for plant matter are adjusted for moisture content.

Total THC = (THCa x 0.877) + Δ9-THC
Total CBD = (CBDa x 0.877) + CBD

Percentage results are reported by mass.
mg/g results are reported as mass component per mass material.

Abbreviations: UV - Ultraviolet, HPLC - High Pressure Liquid Chromatography, RL - Reporting Limit, RPD - Relative Percent Difference, RSD - Relative Standard Deviation

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Kyle W. Felling
Kyle W. Felling, Ph.D.
Laboratory Director

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TERPENOID PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: HS/GC/FID (Internal Method-002)
Instrument: Agilent 6890

Deviations from SOP:
None

<u>Terpene</u>	<u>Result</u> <u>(µg/g)</u>	<u>Result</u> <u>(%)</u>
α-Bisabolol	-	-
Camphene	-	-
δ-3-Carene	-	-
β-Caryophyllene	-	-
Caryophyllene oxide	-	-
p-Cymene	-	-
Eucalyptol	-	-
Geraniol	-	-
Guaiol	-	-
α-Humulene	-	-
Isopulegol	-	-
d-Limonene	-	-
Linalool	-	-
β-Myrcene	-	-
cis-Nerolidol	-	-
trans-Nerolidol	-	-
α-Ocimene	-	-
β-Ocimene	-	-
α-Pinene	-	-
β-Pinene	-	-
α-Terpinene	-	-
γ-Terpinene	-	-
Terpinolene	-	-
TOTAL	0	0



Abbreviations: HS - Headspace, GC - Gas Chromatography, MS - Mass Spectrometry, RL - Reporting Limit

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"-" Not detected above RL.

Reporting Limit (µg/g): 5.79

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Remarks:

RESIDUAL SOLVENT PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: USP <467>
Instrument: Agilent 6890

Deviations from SOP:
 None

Solvent	Result (µg/g)	Action Level (µg/g)	Solvent	Result (µg/g)	Action Level (µg/g)
Acetone (67-64-1)	-	1000	n-Heptane (142-82-5)	-	1000
Acetonitrile (75-5-8)	-	410	n-Hexane (110-54-3)	-	60
Benzene (71-43-2)	-	2	Isobutane (75-28-5)	-	1000
n-Butane (106-97-2)	-	1000	Isopropanol (67-63-0)	-	1000
1-Butanol (71-36-3)	-	5000	Isopropyl acetate (108-21-4)	-	5000
2-Butanol (78-92-2)	-	5000	Isopropyl benzene (98-82-8)	-	70
2-Butanone (78-93-3)	-	5000	Methanol (67-56-1)	-	3000
Cyclohexane (110-82-7)	-	3880	2-Methylbutane (78-78-4)	-	5000
1,2-Dimethoxyethane (110-71-4)	-	100	Methylene chloride (75-9-2)	-	600
N,N-Dimethylacetamide (127-19-5)	-	1090	2-Methylpentane (107-83-5)	-	290
2,2-Dimethylbutane (75-83-2)	-	290	3-Methylpentane (96-10-0)	-	290
2,3-Dimethylbutane (79-29-8)	-	290	n-Pentane (109-66-0)	-	1000
N,N-Dimethylformamide (68-12-2)	-	880	1-Pentanol (71-41-0)	-	5000
Dimethylsulfoxide (67-68-5)	-	5000	n-Propane (74-98-6)	-	1000
1,4-Dioxane (123-91-1)	-	380	1-Propanol (71-23-8)	-	5000
Ethanol (64-17-5)	-	5000	Pyridine (110-86-1)	-	200
2-Ethoxyethanol (110-80-5)	-	160	Tetrahydrofuran (109-99-9)	-	720
Ethyl ether (60-29-7)	-	5000	Tetramethylene sulfone (126-33-0)	-	160
Ethyl acetate (141-78-6)	-	5000	Toluene (108-88-3)	-	180
Ethyl benzene (100-41-4)	-	217	o-Xylene (95-47-6)	-	430
Ethylene glycol (107-21-1)	-	620	m,p-Xylene (108-38-3 or 106-42-3)	-	430
Ethylene oxide (75-21-8)	-	50	Xylenes* (1330-20-7)	-	430



Color Key

RESULT < 1/2 AL
1/2 AL < RESULT < AL
RESULT > AL

Reporting Limit (µg/g)
 1/2 of AL

"-" not detected above reporting limit

"*" - o,m,p-Xylene and Ethylbenzene

Solvent	Synonym(s)	Solvent	Synonym(s)	Solvent	Synonym(s)
Acetonitrile	Methyl Cyanide, ACN	2-Ethoxyethanol	Cellosolve, Ethyl glycol	Methanol	Methyl alcohol
1-Butanol	n-Butanol, Butyl Alcohol	Ethyl ether	Diethyl ether, Ether	2-Methylbutane	Isopentane
2-Butanol	sec-Butyl alcohol	Ethyl acetate	EtOAc	Methylene chloride	Dichloromethane
2-Butanone	Methyl ethyl ketone, MEK	Ethyl benzene	Phenylethane	2-Methylpentane	Isohexane
1,2-Dimethoxyethane	Monoglyme	Ethylene glycol	1,2-Ethanediol	1-Pentanol	n-Amyl alcohol
2,3-Dimethylbutane	Neohexane	Ethylene oxide	Oxirane	1-Propanol	Propyl alcohol
2,3-Dimethylbutane	Diisopropyl	Isobutane	2-Methylpropane	Tetrahydrofuran	THF
N,N-Dimethylformamide	DMF	Isopropanol	2-Propanol, IPA	Tetramethylene sulfone	Sulfolane
Dimethylsulfoxide	DMSO	Isopropyl Acetate	Acetic acid isopropyl ester	Xylene	Dimethylbenzene

Abbreviations: HS-Headspace, GC-Gas Chromatography, MS-Mass Spectrometry, RL-Reporting Limit, AL-Action Level
 CAS-Chemical Abstract Services

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Date Received: 07/29/2019

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Date Completed: 08/01/2019

Remarks:

PESTICIDES PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: LC/MS/MS and GC/MS
Instrument: Waters Acquity/TQD

Deviations from SOP:
 None

Pesticide	Result (µg/g)	Action Level (µg/g)	Pesticide	Result (µg/g)	Action Level (µg/g)
Abamectin (71751-41-2)	-	0.5	Imazalil (35554-44-0)	-	0.2
Acephate (30560-19-1)	-	0.4	Imidacloprid (138261-41-3)	-	0.4
Acequinocyl (57960-19-7)	-	2	Kresoxim-methyl* (143390-89-0)	-	0.4
Acetamiprid (135410-20-7)	-	0.2	Malathion (121-75-5)	-	0.2
Aldicarb (116-06-3)	-	0.4	Metalaxyl* (57837-19-1)	-	0.2
Azoxystrobin (131860-33-8)	-	0.2	Methiocarb (2032-65-7)	-	0.2
Bifenazate* (149877-41-8)	-	0.2	Methomyl (16752-77-5)	-	0.4
Bifenthrin* (82657-04-3)	-	0.2	Methyl parathion* (298-0-0)	-	0.2
Boscalid* (188425-85-6)	-	0.4	MGK 264* (113-48-4)	-	0.2
Carbaryl (63-25-2)	-	0.2	Myclobutanil (88671-89-0)	-	0.2
Carbofuran (1563-66-2)	-	0.2	Naled (300-76-5)	-	0.5
Chlorantraniliprole (800008-45-7)	-	0.2	Oxamyl (23135-22-0)	-	1
Chlorfenapyr* (122453-73-0)	-	1	Paclobutrazol* (76738-62-0)	-	0.4
Chlorpyrifos* (2921-88-2)	-	0.2	Permethrins* (52645-53-1)	-	0.2
Clofentezine (74115-24-5)	-	0.2	Phosmet* (732-11-6)	-	0.2
Cyfluthrin* (68359-37-5)	-	1	Piperonyl butoxide* (51-03-6)	-	2
Cypermethrin* (52315-07-8)	-	1	Prallethrin* (2331-36-9)	-	0.2
Daminozide (1596-84-5)	-	1	Propiconazole (60207-90-1))	-	0.4
DDVP (62-73-7)	-	0.1	Propoxur* (114-26-1)	-	0.2
Diazinon* (333-41-5)	-	0.2	Pyrethrins* (8003-34-7)	-	1
Dimethoate (60-51-5)	-	0.2	Pyridaben* (96489-71-3)	-	0.2
Ethoprophos* (13194-48-4)	-	0.2	Spinosad A (168316-95-8)	-	0.2
Etofenprox (80844-07-1)	-	0.4	Spinosad D (168316-95-8)	-	0.2
Etoxazole (153233-91-1)	-	0.2	Spiromesifen (283594-90-1)	-	0.2
Fenoxycarb (72490-01-8)	-	0.2	Spirotetramat (203313-25-1)	-	0.2
(E)-Fenpyroximate (134098-61-6)	-	0.4	Spiroxamine (118134-30-8)	-	0.4
Fipronil* (120068-37-3)	-	0.4	Tebuconazole (80443-41-0)	-	0.4
Fonicamid (158062-67-0)	-	1	Thiacloprid (111988-49-9)	-	0.2
Fludioxinil (131341-86-1)	-	0.4	Thiamethoxam (153719-23-4)	-	0.2
Hexythiazox (78587-05-0)	-	1	Trifloxystrobin* (141517-21-7)	-	0.2



Color Key

RESULT < 1/2 AL
1/2 AL < RESULT < AL
RESULT > AL

Reporting Limit (µg/g)
 1/2 of AL

"-" not detected above reporting limit

*** analyzed by GC/MS (all others analyzed by LC/MS/MS)

Permethrins measured as the cumulative residue of the *cis*- and *trans*-permethrin isomers.

Pyrethrin measures as the cumulative residue of pyrethrin I, cinerin I, and jasmolin I.

Abbreviations: LC - Liquid Chromatography, GC - Gas Chromatography, MS - Mass Spectrometry, RK - Reporting Limit, AL - Action Level, CAS - Chemical Abstract Services

Pesticide	Synonym(s)	Pesticide	Synonym(s)	Pesticide	Synonym(s)
Cyfluthrin	Baythroid	Myclobutanil	Sythane	Propiconazole	Tilt
DDVP	Dichlorvos	Naled	Dibrom	Propoxur	Baygon
Ethoprophos	Prophos	Phosmet	Imidan		

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Remarks:

MYCOTOXIN PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: LC/MS/MS
Instrument: Waters Acquity/TQD

Deviations from SOP:
None

<u>Mycotoxin</u>	<u>Result</u> ($\mu\text{g/kg}$)	<u>Action Level</u> ($\mu\text{g/kg}$)
Aflatoxin B1	-	20
Aflatoxin B2	-	20
Aflatoxin G1	-	20
Aflatoxin G2	-	20
Ochratoxin A	-	20



Abbreviations: EC - Escherichia Coli, CFU - Colony-Forming Unit,
RL - Reporting Limit, AL - Action Level

Color Key

RESULT < 1/2 AL
1/2 AL < RESULT < AL
RESULT > AL

Reporting Limit (CFU/g)

1

"-" not detected above reporting limit

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Remarks:

HEAVY METAL PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: ICP/MS
Instrument: PerkinElmer Elan 9000

Deviations from SOP:
None

<u>Heavy Metal</u>	<u>Result (µg/kg)</u>	<u>Action Level (µg/kg)</u>
Arsenic (As)	-	400
Cadmium (Cd)	-	440
Lead (Pb)	-	100
Mercury (Hg)	-	200



Abbreviations: ICP - Inductively-Coupled Plasma, OES - Optical Emission Spectroscopy, RL - Reporting Limit, AL - Action Level

Color Key

RESULT < 1/2 AL
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RESULT > AL

Reporting Limit (µg/kg)
50

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Remarks:

MICROBIOLOGICAL PROFILE

Analysis Date/Time: 07/29/2019 1632
Analyst: OL

Method: Hardy Diagnostics CompactDry
Instrument:

Deviations from SOP:
None

<u>Bacteria/Microbe</u>	<u>Result (CFU/g)</u>	<u>Action Level (CFU/g)</u>
Aerobic Plate Count, Total	NT	100
Coliforms, Total	Absent	100
Escherichia Coli (E. Coli)	Absent	1
Mold	Absent	10000
Yeast	Absent	10000
Salmonella spp.	Absent	1



Abbreviations: EC - Escherichia Coli, CFU - Colony-Forming Unit, RL - Reporting Limit, AL - Action Level, NT - Not Tested

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1/2 AL < RESULT < AL
RESULT > AL

Reporting Limit (CFU/g)
1

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