

Abstract:

PRE-RELEASE 0.90

Using Methanol as a solvent in THC/CBD extractions can be safe. THC/CBD extractions with a two pass distillation process can result in residual Methanol under 100ppm per gram. This paper reports three lab results of Residual Solvents in the range of 33-55ppm.

Proposal:

The proposed procedure for the extraction and subsequent distillations is presented in the illustration below.

Proposed Safe Cost Effective Home Based Methanol Extraction of Rick Simpson Oil, aka RSO

Boiling Points



Water 212 f
Ethanol 173 f
Methanol 143 f

Go ahead and scream, get it out of your system, then come back and read through this proposal, this is worth a discussion if nothing else. Here is a cannabis extraction procedure to create Rick Simpson Oil using a novel interdiction to remove the Methanol during final stages of the oil reduction. Basically this works due to the boiling points of all ingredients. Methanol boils off quickly, then the Ethanol, then the final water content leaving a sticky tar. Why even do this? Methanol is substantially cheaper than the cost of retail Ethanol.

In order to protect against impurities, using ACS grade Methanol is a must for its purity. Lesser grades or using Isopropyl may leave potential harmful residues in the final product. As a precaution, the final step of lab testing is a firewall against using tainted oil. If the results come back showing residues, throw it out and start over.

I will point out, beer and wine contain small quantities of Methanol. I will wager, you will ingest more Methanol from a single beer or glass of wine than from one dose of this RSO oil. Here's why - Step 3 takes the reduced extraction then adds a whole cup of Vodka that is a mix of ethanol and water. By the time the Vodka is half boiled off, the Methanol is long gone. Its Physics, plain and simple.

Steps

#1 Methanol Soak for Extraction



#2 Distill to reduce down to 50/50 mix of oil & Methanol



#3 Create a reduction by boiling the contents at 212 degrees all the way down to final oil/tar.



#4 Pour in 1/2 cup 100 proof vodka and stir to rehydrate the oil mix.



#5 Complete the reduction by boiling the contents at 212 degrees all the way down to final oil/tar.



#6 Send a sample to the lab to test for solvent residues.



Process:



This test was performed on 6.5 ounces of dry decarboxylated plant material, ground up and placed in a 64oz mason jar. First wash was performed using Methanol ACS Reagent for 15 minutes, and a secondary rinse of the same for less than one minute. Both the primary and subsequent rinse was poured into a bucket, filtered through nylon mesh, then repoured into three 32oz quart mason jars. Each jar was labeled A, B, and C. Jars B and C weighed in at 23.44 oz and 23.63 oz

respectively. Jar A was not weighed, but visually can be seen below marginally fuller than Jar B.

The chosen rehydration solutions are:

For test A – 100% water

For test B – Vodka at 100 proof (50/50 water/ethanol mix)

For test C – Everclear 190 proof (95% ethanol, 5% water)



The distilling setup is a Duxtop 9100mc hotplate and a 2 quart stainless steel pot. The Duxtop hotplate was chosen for its heating control of 100 watt increments starting at 200 watts up to 1800 watts.

The following steps were performed on each sample jar. Starting with sample A, the jar was poured into the pot, heat (800 watts) applied to bring the contents to a boil (phase 1). Heat was reduced to 500 watts when the transition from boiling to bubbling (phase 2) of the oil/methanol solution. Each bubbling phase was terminated when there was no observable bubbling action, just a smooth layer of oil with wisps of smoke of evaporating oil. As expected, around 2 ml of Cannabis oil was extracted from the 6.5 plant material, for a total of 13ml. For the three sample jars A,B & C, there was approximately 4ml of oil present at the end of each reduction.

Given there was only 4ml of distilled oil, it was decided to use only 25ml of each re-hydration fluid instead of the suggested 250ml (1 cup). Each jar was processed identically except for the re-hydrating solution, as follows -

Jar A was poured in the pot, brought to a boil & simmered till only Cannabis oil remained. A 1-2ml (sample A1) was taken using a 10ml syringe. 25ml of water was added and then simmered down to oil. A 1-2ml (sample A2) was taken using a 10ml syringe. Remaining contents stored for later..

Jar B was poured in the pot, brought to a boil & simmered till only Cannabis oil remained. A 1-2ml (sample B1) was taken using a 10ml syringe. 25ml of 100 proof vodka was added and then simmered down to oil. A 1-2ml (sample B2) was taken using a 10ml syringe. Remaining contents stored for later..

Jar C was poured in the pot, brought to a boil & simmered till only Cannabis oil remained. A 1-2ml (sample C1) was taken using a 10ml syringe. 25ml of 190 proof vodka was added and then simmered down to oil. A 1-2ml (sample C2) was taken using a 10ml syringe. Remaining contents stored for later..



Observations:

The use of a stand-alone 2 quart pot versus a double boiler was used since this is the typical home setup using a consumer grade water distiller as pictured in Step #2 of the above original proposal.

Using this hotplate setup for the final reduction gives better visibility of the oil as it reaches the final reduced state.

The picture to the right was taken during Test A, Step #3 as the Methanol was bubbling and dispersing.



The one uncontrolled aspect of the tests was terminating the simmering reduction when there was no observable bubbling in the oil. This probably was the contributing factor to the wide range of results at the end of Step #3, shown in the table below.

Lab results summary:

The actual lab test results are presented below. This table shows the "Residual Solvents" portion of each test. Any solvent that was Not Detectable (nd) before and after, have been eliminated here for brevity. Only 4 of the 16 potential solvents were detected.

| Jar | Step #3 | | Step #5 | |
|-----|---------------|-----|---------------|-----------|
| A | solvents | PPM | Solvents | PPM |
| | Acetone | 20 | Acetone | nd |
| | Ethanol | 34 | Ethanol | nd |
| | Ethyl Acetate | nd | Ethyl Acetate | nd |
| | Methanol | 612 | Methanol | 55 |
| B | | | | |
| | Acetone | 20 | Acetone | nd |
| | Ethanol | 36 | Ethanol | 167 |
| | Ethyl Acetate | nd | Ethyl Acetate | nd |
| | Methanol | 573 | Methanol | 37 |
| C | | | | |
| | Acetone | 18 | Acetone | nd |
| | Ethanol | 22 | Ethanol | 4340 est. |
| | Ethyl Acetate | nd | Ethyl Acetate | 33 |
| | Methanol | 297 | Methanol | 45 |

Tests A and B used water in the purge and shows over a 10 folder reduction of methanol at the end of Step #5. Test C shows a lower starting Methanol PPM but resulted in the same range of final PPM.

Test C Step #5 shows 4340 PPM which is an estimate by the lab.

Test A, Step #3 results:

327 N Tower Ave
 Centralia WA 98531
 (360) 559-6261
 mail@prxslab.com

Certificate of Analysis



A1

Client:
 Address:
 License:

Lab ID: P200715-2 001
 Date Received: 7/15/2020
 Analysis Completed: 7/17/2020

Original Global ID: n/a
 Lab Global ID: n/a
 Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVA | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹Total THC = THCA x 0.877 + Δ9 THC.

²Total CBD = CBDA x 0.877 + CBD.

³Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpinol | n/a | Guaiol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | 20 | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | 34 | n/a | n/a |
| Ethyl Acetate | nd | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 612 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



Not all testing listed above is included in our A2LA Scope of Accreditation. Please consult A2LA Certificate #4803.01 for a list of accredited tests.

The abbreviations nd, n/a, e.v., and trnc stand for not detected, not applicable, estimated value, and too numerous to count respectively.

Testing results are certified by scientific examination of a single sample, as identified by the Sample ID, provided by the Producer/Processor. The sample, as received, was homogenized before subsamples were drawn for specific analysis. Praxis Laboratory and its staff did not observe or participate in the sample selection process, and cannot confirm the authenticity of the sample or its representativeness of the associated lot/batch. The results pertain only to the sample tested and no other sample.

Test A, Step #5 results:

327 N Tower Ave
Centralia WA 98531
(360) 559-6261
mail@prxslab.com

Certificate of Analysis



A2

Client:
Address:

License:

Lab ID: P200715-2 002
Date Received: 7/15/2020
Analysis Completed: 7/17/2020

Original Global ID: n/a
Lab Global ID: n/a
Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDA | n/a | | |
| CBDV | n/a | | |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVA | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹ Total THC = THCA x 0.877 + Δ9 THC.

² Total CBD = CBDA x 0.877 + CBD.

³ Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpineol | n/a | Guaialol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | nd | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | nd | n/a | n/a |
| Ethyl Acetate | nd | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 55 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



Not all testing listed above is included in our AZLA Scope of Accreditation. Please consult AZLA Certificate #4803.01 for a list of accredited tests.

The abbreviations nd, n/a, < x, and < yz stand for not detected, not applicable, estimated value, and too numerous to count respectively.

Testing results are certified by scientific examination of a single sample, as identified by the Sample ID, provided by the Producer/Processor. The sample, as received, was homogenized before subsamples were drawn for specific analysis. Praxis Laboratory and its staff did not observe or participate in the sample selection process, and cannot confirm the authenticity of the sample or its representativeness of the associated lot/batch. The results pertain only to the sample tested and no other sample.

Test B, Step #3 results:

327 N Tower Ave
 Centralia WA 98531
 (360) 559-6261
 mail@prxslab.com

Certificate of Analysis



B1

Client:
 Address:

License:

Lab ID: P200715-2 003
 Date Received: 7/15/2020
 Analysis Completed: 7/17/2020

Original Global ID: n/a
 Lab Global ID: n/a
 Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDA | n/a | | |
| CBDV | n/a | | |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVa | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹ Total THC = THCA x 0.877 + Δ9 THC.

² Total CBD = CBDA x 0.877 + CBD.

³ Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpineol | n/a | Guaialol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | 20 | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | 36 | n/a | n/a |
| Ethyl Acetate | nd | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 573 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



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The abbreviations nd, n/a, e.x., and tnc stand for not detected, not applicable, estimated value, and too numerous to count respectively.

Testing results are certified by scientific examination of a single sample, as identified by the Sample ID, provided by the Producer/Processor. The sample, as received, was homogenized before subsamples were drawn for specific analysis. Praxis Laboratory and its staff did not observe or participate in the sample selection process, and cannot confirm the authenticity of the sample or its representativeness of the associated lot/batch. The results pertain only to the sample tested and no other sample.

Test B, Step #5 results:

327 N Tower Ave
Centralia WA 98531
(360) 559-6261
mail@prxslab.com

Certificate of Analysis



B2

Client:
Address:
License:

Lab ID: P200715-2 004
Date Received: 7/15/2020
Analysis Completed: 7/17/2020

Original Global ID: n/a
Lab Global ID: n/a
Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDA | n/a | | |
| CBDV | n/a | | |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVA | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹ Total THC = THCA x 0.877 + Δ9 THC

² Total CBD = CBDA x 0.877 + CBD

³ Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpineol | n/a | Guaiol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | nd | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | 167 | n/a | n/a |
| Ethyl Acetate | nd | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 37 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



Not all testing listed above is included in our AZLA Scope of Accreditation. Please consult AZLA Certificate #4803.01 for a list of accredited tests.

The abbreviations nd, n/a, e.v., and trtc stand for not detected, not applicable, estimated value, and too numerous to count respectively.

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Test C, Step #3 results:

327 N Tower Ave
Centralia WA 98531
(360) 559-6261
mail@prxslab.com

Certificate of Analysis



C1

Client:

Address:

License:

Lab ID: P200715-2 005
Date Received: 7/15/2020
Analysis Completed: 7/17/2020

Original Global ID: n/a
Lab Global ID: n/a
Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDA | n/a | | |
| CBDV | n/a | | |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVA | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹ Total THC = THCA x 0.877 + Δ9 THC.

² Total CBD = CBDA x 0.877 + CBD.

³ Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpineol | n/a | Guaiol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | 18 | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | 22 | n/a | n/a |
| Ethyl Acetate | nd | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 297 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



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Test C, Step #5 results:

327 N Tower Ave
Centralia WA 98531
(360) 559-6261
mail@prxslab.com

Certificate of Analysis



C2

Client:
Address:

License:

Lab ID: P200715-2 006
Date Received: 7/15/2020
Analysis Completed: 7/17/2020

Original Global ID: n/a
Lab Global ID: n/a
Sample Type: Full Extract Cannabis Oil

Cannabinoid Concentration Analysis

| | Result (%) | | Result (%) |
|---------|------------|---------------------------------|------------|
| CBC | n/a | Total THC ¹ | n/a |
| CBCA | n/a | Total CBD ² | n/a |
| CBD | n/a | Total Cannabinoids ³ | n/a |
| CBDA | n/a | | |
| CBDV | n/a | | |
| CBDVA | n/a | | |
| CBG | n/a | | |
| CBGA | n/a | | |
| CBL | n/a | | |
| CBN | n/a | | |
| CBNA | n/a | | |
| CBT | n/a | | |
| THCA | n/a | | |
| THCV | n/a | | |
| THCVA | n/a | | |
| Δ-8 THC | n/a | | |
| Δ-9 THC | n/a | | |

Method: HPLC

Notes: ¹ Total THC = THCA x 0.877 + Δ9 THC.

² Total CBD = CBDA x 0.877 + CBD.

³ Sum of all cannabinoids without a conversion factor applied to THCA or CBDA.

Foreign Matter Screening

| | Result (%) | WSLCB Limit | Pass/Fail |
|-------|------------|-------------|-----------|
| Stems | n/a | < 5 | n/a |
| Seeds | n/a | < 2 | n/a |
| Other | n/a | < 2 | n/a |

Method: Visual / Microscopy

Water Activity Analysis

| | Result (aW) | WSLCB Limit | Pass/Fail |
|----------------|-------------|-------------|-----------|
| Water Activity | n/a | < 0.65 | n/a |

Method: Hygrometer

Moisture Content Analysis

| | Result (%) | WSLCB Limit | Pass/Fail |
|------------------|------------|-------------|-----------|
| Moisture Content | n/a | < 15 | n/a |

Method: Gravimetric

Terpene Concentration Analysis

| | Result (%) | | Result (%) |
|--------------------|------------|-----------------|------------|
| Alpha-Bisabolol | n/a | D-Limonene | n/a |
| Alpha-Humulene | n/a | Fenchone | n/a |
| Alpha-Pinene | n/a | Gamma-Terpinene | n/a |
| Alpha-Terpinene | n/a | Geraniol | n/a |
| Alpha-Terpineol | n/a | Guaiol | n/a |
| Beta-Caryophyllene | n/a | Isopulegol | n/a |
| Beta-Myrcene | n/a | Linalool | n/a |
| Beta-Pinene | n/a | Nerolidol | n/a |
| Borneol | n/a | Ocimene | n/a |
| Camphene | n/a | P-Cymene | n/a |
| Citral | n/a | Pulegone | n/a |
| Citronellol | n/a | Terpinolene | n/a |
| Delta-3-Carene | n/a | 2-Piperidinone | n/a |
| Dihydrocarveol | n/a | Total Terpenes: | n/a |

Method: GC-FID

Microbiological Screening

| | Result (CFU/g) | WSLCB Limit | Pass/Fail |
|--------------------|----------------|-------------|-----------|
| Enterobacteriaceae | n/a | < 10,000 | n/a |
| E. coli | n/a | * | n/a |
| Salmonella | n/a | * | n/a |

Method: FDA BAM

Notes: * Not detected in 1 gram.

Mycotoxin Screening

| | Result (ppb) | WSLCB Limit | Pass/Fail |
|------------|--------------|-------------|-----------|
| Aflatoxin | n/a | < 20 | n/a |
| Ochratoxin | n/a | < 20 | n/a |

Method: ELISA

Residual Solvent Screening

| | Result (ppm) | WSLCB Limit | Pass/Fail |
|-----------------|--------------|-------------|-----------|
| Acetone | nd | n/a | n/a |
| Benzene | nd | n/a | n/a |
| Butanes | nd | n/a | n/a |
| Chloroform | nd | n/a | n/a |
| Cyclohexane | nd | n/a | n/a |
| Dichloromethane | nd | n/a | n/a |
| Ethanol | 4340 e.v. | n/a | n/a |
| Ethyl Acetate | 33 | n/a | n/a |
| Heptanes | nd | n/a | n/a |
| Hexanes | nd | n/a | n/a |
| Isopropanol | nd | n/a | n/a |
| Methanol | 45 | n/a | n/a |
| Pentanes | nd | n/a | n/a |
| Propane | nd | n/a | n/a |
| Toluene | nd | n/a | n/a |
| Total Xylene | nd | n/a | n/a |

Method: GC-FID HS-FET

This report was reviewed by:

Megan Stang, Project Manager on July 17th, 2020

This report was approved by:

Elizabeth Doar, Laboratory Administrator on July 17th, 2020



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Further Reading:

[Residual Methanol in Botanical Dietary Ingredients](#)

HerbalEgram: Volume 11, Issue 8, August 2014

By Deepak Mundkinajeddu, PhD, and Amit Agarwal, PhD