

KEYSTONE LABS

Cannabis Testing Services

January 2022

Keystone Labs is a GMP testing facility established in 2005, serving the cannabis industry since 2015 by providing analytical testing services with the highest data integrity. Our pharmaceutical level requirements for validation, data integrity, instrument calibration, and documentation ensure we meet and exceed expectations of Health Canada. Keystone offers the Health Canada full suite of required compliant testing and additional services such as Environmental Monitoring, Stability Studies, additional microbiology testing, and terpene analysis. We follow our validated methods and the US and European Pharmacopoeia, and deliver a fully reviewed Certificate of Analysis to all our customers. Keystone is your lab partner and an extension of your cannabis production team.

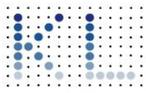
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ANALYTICAL TESTING

*(Health Canada required for regulated facilities)

*Cannabinoid Profile and Potency Testing

Health Canada requires the potency of THC and CBD for labelling purposes. Keystone's testing provides data on the potency level of the ten cannabinoids listed below, or total THC and total CBD.

Keystone Labs offers accurate quantification of cannabinoids using High Performance Liquid Chromatography (HPLC). The HPLC does not heat up the sample, therefore, any acid cannabinoid compounds, such as THC-A will remain in their natural form. This allows accurate quantification of all the acid (THC-A) and neutral (THC) forms of the client's cannabinoid profile and potency.

Instrumentation:

Agilent HPLC with Ultraviolet Detection (UVD)

Δ 9 –Tetrahydrocannabinol (Δ 9-THC)

Tetrahydrocannabinolic acid (THCA)

Cannabidiol (CBD)

Cannabidiolic acid (CBDA)

Cannabichromene (CBC)

Cannabigerol (CBG)

Cannabigerolic acid (CBGA)

Cannabidivarin (CBDV)

Cannabinol (CBN)

Tetrahydrocannabivarin (THCV)

*Visual Examination

The visual inspection of raw cannabis material will document the size and shape of the bud and leaves, colour of the leaves, and the presence or absence of trichomes and stigma. An examination is performed to determine the presence or absence of foreign material (evidence of vermin or extraneous substances).

*Loss on Drying (Moisture Content)

The weight of volatile impurities relative to the total weight of the sample assessed by drying the sample in an oven.

*Microbial Analysis

Testing is performed according to current USP <2021> and <2022>, and/or EP 2.6.12 and EP 2.6.31 procedures as per client requirements. Microbial testing includes enumeration of Total Yeast and Mold, Bile Tolerant Organisms and Total Aerobic Organisms as well as the Absence of *Escherichia coli*, and *Salmonella* species.

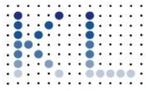
Price and Service List

Health Canada Required Testing	Description	Cost per sample
Visual Examination	<ul style="list-style-type: none"> Physical Identity Absence of Foreign Objects 	\$16
Loss on Drying (Moisture Content)	<ul style="list-style-type: none"> Loss on Drying 	\$68
Cannabinoid Potency	<ul style="list-style-type: none"> THC, THCA, CBD, CBDA <ul style="list-style-type: none"> *minimum required* 	\$129
Microbial Enumeration	<ul style="list-style-type: none"> Total Aerobic Count Total Yeast and Mold Count Bile Tolerant Enumeration 	\$110
Absence of Microbial Contaminants	<ul style="list-style-type: none"> <i>Escherichia coli</i> <i>Salmonella species</i> 	\$105

¹ Testing conducted for cannabis oil extraction using hydrocarbons only

Optional Testing	Description	Cost per sample
Cannabinoid Profile	<ul style="list-style-type: none"> Full 10 cannabinoids 	\$205
Absence of Microbial Contaminants	<ul style="list-style-type: none"> <i>Pseudomonas aeruginosa</i> <i>Staphylococcus aureus</i> 	\$110
Environmental Monitoring (active air, passive air and surface contact sampling)	<i>Contact us for more information</i>	
Stability Studies	<i>Contact us for more information</i>	

Ask about Service Agreement discounts.



Sample Amounts Required for each Cannabis Test using USP or EP Methods

Test	Sample Amount USP Methods (grams for dry cannabis, mL for oil or capsules)	Sample Amount EP Methods (grams for dry cannabis, mL for oil or capsules)
Visual Examination	1	1
Loss on Drying (Moisture Content) ⁵	5	5
Cannabinoid Potency & Profile	1	1
Microbial Enumeration	10	10
Absence of Microbial Contaminants / BTGN	10	26
Total sample volume	27 grams or mL	43 gram or mL

NOTE: The amounts of required sample sizes are specified in the Current United States Pharmacopeia (USP) and Current European Pharmacopeia (EP)

Methods and Specifications for Cannabis Testing

Test	Method (validated, USP or EP)	Specifications
Visual Examination	Visual Exam SOP-4002	Report Result
Loss on Drying (Moisture Content)	Loss on Drying USP <731>	Report Result
	Loss on Drying EP 2.2.32	Report Result
Potency	Validated method SOP-4033	Report <u>Total THC</u> in mg/g Report <u>Total CBD</u> in mg/g
Cannabinoid Profile	Validated method SOP-4033	Positive for cannabinoids, report profile (THC, THCA, CBD, CBDA, CBG, CBGA, CBC, CBN, THC, V, CBDV)
Microbial Enumeration	Microbial Enumeration Tests – Nutritional and Dietary Supplements Current USP <2021>	As per USP <2023> Microbial Attributes of Nonsterile Nutritional and Dietary Supplements; Specifications for Dried or Powdered Botanicals: <u>Total Aerobic Count</u> ≤100,000 CFU/g <u>Total Yeast and Mold</u> ≤1,000 CFU/g <u>Bile Tolerant Gram-Negative Bacteria</u> ≤1,000 MPN/g
	Microbiological Examination of Non-Sterile Products: Microbial Enumeration tests Current EP 2.6.12	As per EP 5.1.8 Specifications Table C: <u>Total Aerobic Count</u> ≤500,000 CFU/g <u>Total Yeast and Mold</u> ≤50,000 CFU/g <u>Bile Tolerant Gram-Negative Bacteria</u> ≤10,000 CFU/g



Test	Method (validated, USP or EP)	Specifications
Absence of Microbial Contaminants	Microbial Procedures for Absence of Specified Microorganisms – Nutritional and Dietary Supplements Current USP <2022>	As per USP <2023> Microbial Attributes of Nonsterile Nutritional and Dietary Supplements; Dried or Powdered Botanicals <u><i>Escherichia coli</i></u> absent in 10g <u><i>Salmonella species</i></u> absent in 10g
	Microbiological Examination of Herbal Medicinal Products for Oral Use and Extracts Used in Their Preparation Current EP 2.6.31	As per EP 5.1.8 Specifications Table C: <u><i>Escherichia coli</i></u> absent in 1g <u><i>Salmonella species</i></u> absent in 25g

¹ Testing conducted for cannabis oil extraction using hydrocarbons only