

Leading the Science of Cannabis



**Steep Hill Labs, Inc.
seeks to protect
public health through
the development of
infrastructure and
analytical services
for legally-authorized
cultivators, processors,
distributors, retailers,
and regulators of
cannabis.**

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Understanding the Science of Cannabis



Cannabinoids

Cannabinoids are chemical compounds found in cannabis plants.

They are a subset of the 80-100 terpene-derived molecules found only in cannabis plants. Thus, all cannabinoids are terpenoids, but not all terpenoids are cannabinoids. They all have similar structures, but have been shown to have very different effects. Cannabinoids, are found in highest concentrations within the trichomes (or resin glands) found predominately on the female flowers. Most cannabinoids are found in both acid and neutral forms, and majority are prevalent in acids.

Decarboxylation

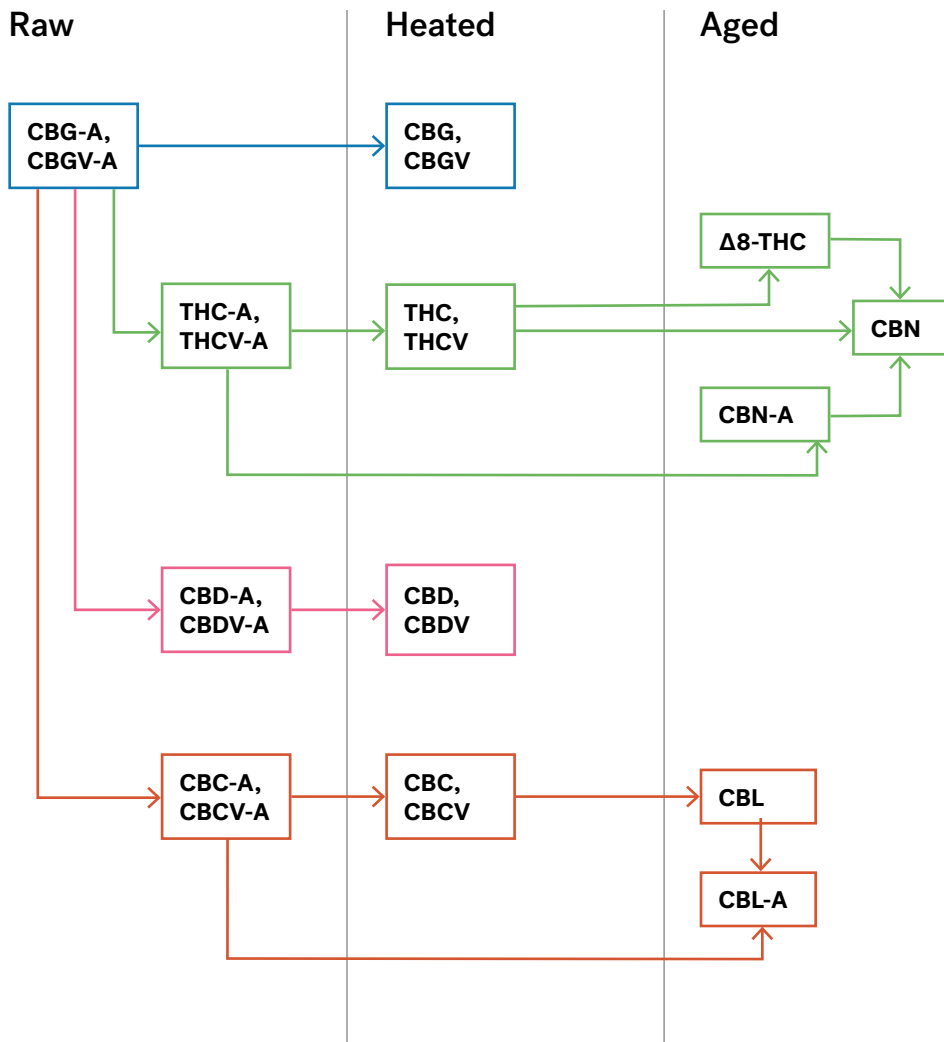
Decarboxylation is the conversion of a cannabinoid from its acid form to its neutral form, which occurs during heat exposure. For example, Delta-9-THC is the result of THC-A ('A' for acid) decarboxylating. The difference? Only Δ 9-THC causes the euphoric sensation associated with cannabis and THC-A is not psychoactive! Δ 9-THC is the best way to measure a cannabis product's psychoactive potency, and a typical cannabis plant contains about 13% to 25%.

We Quantify for 17 Cannabinoids

CBG-A	Cannabigerolic Acid
CBG	Cannabigerol
THC-A	Tetrahydrocannabinolic Acid
THC-C4	Tetrahydrocannabinol-C4
THCV-A	Tetrahydrocannabivarinic Acid
Δ 9THC	Delta-9-Tetrahydrocannabinol
Δ 8THC	Delta-8-Tetrahydrocannabinol
THCV	Tetrahydrocannabivarin
CBN-A	Cannabinolic Acid
CBN	Cannabinol
CBD-A	Cannabidiolic Acid
CBDV-A	Cannabidivarinic Acid
CBD	Cannabidiol
CBDV	Cannabidivarin
CBC-A	Cannabichromic Acid
CBC	Cannabichromene
CBC-A	Cannabicyclol Acid

Cannabinoid Synthesis

By simply applying heat or exposing cannabinoids to light and air there are a multitude of opportunities for other cannabinoids.



Therapeutic Properties of Cannabinoids

Within this brief list, there are many different medical benefits associated with the variety of cannabinoids.

Raw

CBGA

analgesic
anti-inflammatory

THC-A

anti-cancer
anti-inflammatory
anti-spasmodic

CBD-A

anti-cancer
anti-inflammatory

CBC-A

anti-fungal
anti-inflammatory

CBGV-A, THCV-A, CBDV-A, CBCV-A

anti-inflammatory

CBG

analgesic
anti-bacterial
anti-cancer
anti-depressant
anti-fungal
bone stimulant

Heated

CBG

analgesic
anti-bacterial
anti-cancer
anti-depressant
anti-fungal
bone stimulant

THCV

anti-convulsive
anti-inflammatory
appetite suppressant
bone stimulant
neuroprotective

CBD

analgesic
anti-anxiety
anti-bacterial
anti-cancer
anti-convulsive
anti-depressant
anti-emetic
anti-inflammatory
anti-insomnia
anti-ischemic
anti-psychotic
bone stimulant
immunosuppressive
neuroprotective

Δ 9-THC

analgesic
anti-bacterial
anti-cancer
anti-inflammatory
anti-spasmodic
appetite stimulant
bronchodilator
neuroprotective

CBDV

anti-convulsive
bone stimulant

CBC

analgesic
anti-bacterial
anti-cancer
anti-depressant
anti-fungal
anti-inflammatory
anti-insomnia
bone stimulant

Aged

Δ 8-THC

anti-anxiety
anti-emetic

CBN

analgesic
anti-bacterial
anti-convulsive
anti-inflammatory

CBL

unknown

CBL-A

anti-inflammatory

Terpenoids

Terpenoids are the compounds responsible for a plant's fragrance.

They are found within the resin glands (or trichomes). They interact with cannabinoids, called 'entourage effect' which helps define a given strain's unique quality.

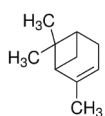
Man kind has been infatuated with terpenes for thousands of years, enjoying the aromas and flavors in beer, candy, perfumes, fruits, incense and much more. In addition to the smells and tastes, we have continuously benefited from the diverse array of the medicinal and nutritional aspects found in terpenes. Terpenoids likely make up the single largest family of chemical compounds available, from across the planet, to herbalists and apothecaries alike for use in compounding remedies and medicine.

We Quantify 10 Terpenoids

- Linalool
- Citronellol
- Carophyllene Oxide
- Myrcene
- Terpinolene
- Limonene
- Alpha Pinene
- Alpha Humulene
- Beta Carophyllene
- Phytol



Therapeutic Properties of Terpenoids and their Smells

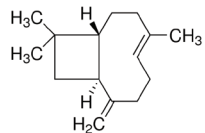


α-Pinene

anti-bacterial
anti-fungal
anti-inflammatory
bronchodilator



pine



β-Caryophyllene

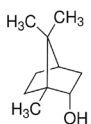
anti-bacterial
anti-cancer
anti-fungal
anti-inflammatory
anti-septic



black pepper



clove

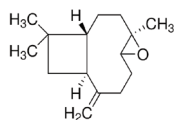


Borneol

analgesic
anti-insomnia
anti-septic
bronchodilator



camphor

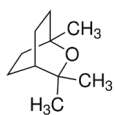


Caryophyllene oxide

anti-fungal
anti-ischemic



eucalyptus

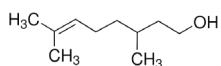


Cineol

anti-bacterial
anti-depressant
anti-inflammatory
anti-ischemic
bronchodilator



tea tree

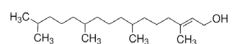


Citronellol

anti-cancer
anti-inflammatory
anti-insomnia
anti-spasmodic



rose

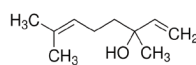


Phytol

anti-insomnia



green tea

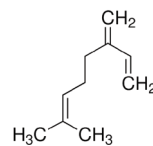


Linalool

anti-anxiety
anti-bacterial
anti-convulsive
anti-depressant
anti-insomnia



lavender

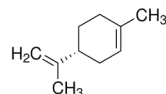


Humulene

anorectic
anti-cancer
anti-bacterial
anti-inflammatory



hops

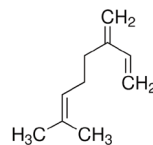


Limonene

anti-anxiety
anti-bacterial
anti-cancer
anti-depressant
anti-fungal
bronchodilator



citrus



Myrcene

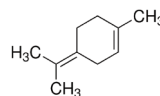
analgesic
anti-cancer
anti-inflammatory
anti-insomnia
anti-spasmodic



lemongrass



mango

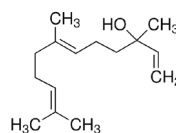


Terpinolene

anti-bacterial
anti-fungal
anti-insomnia
anti-septic



lilac



Nerolidol

anti-fungal
anti-insomnia



wood



citrus rind

Cannabis Contaminants

Potency is important,
safety is our priority.



Residual Solvents

Residual Solvents are the leftover chemicals used to make various cannabinoid extracts. This method allows the lab to identify the extraction process and subsequent quality of any cannabis extract.



Pesticides

Pesticides are common in most agricultural settings. Cannabis is no different. Testing for these residues help protect the consumer from consuming hazardous chemicals like abamectin, bifenazate, and bifenthrin.



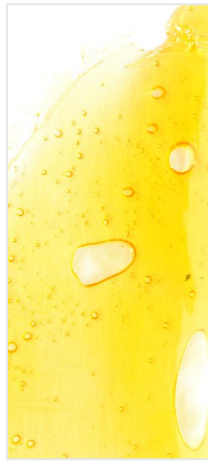
Microbes

Microbes are molds and bacteria that can be high risk to consumers especially with suppressed immune systems. The higher the concentration of these organisms, the greater the risk to consumers.



Mycotoxins

Mycotoxins are incredibly toxic by-products of some molds and fungi.



Types of Cannabis Products

Cannabinoids are processed into various consumer products.



Raw Flowers

Flowers are dried and cured female flowers cultivated from the cannabis plant. They contain cannabinoids in their acid forms, as well as a variety of terpenes.

Concentrates

Concentrates use solvents like Supercritical CO₂ or Nitrogen to extract the cannabinoids from the cannabis plant into a substance with substantially higher concentrations. While most raw flowers test below 20% THC, some concentrates contain over 80% THC. Concentrates contain cannabinoids in their acid and decarboxylated forms and some terpenes.

Edibles

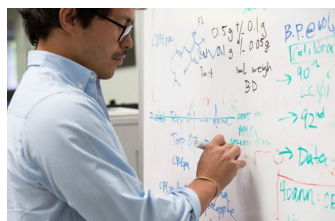
Edibles are food products infused with active cannabinoids, for example: they are available as baked goods, beverages, candy, and countless other items. Manufacturers usually make a cannabinoid extract using butter or a variety of oils, which they then use as an enhanced ingredient in their recipes.

Tinctures

Tinctures are infusions of alcohol, oil, or glycerin. They contain various levels of cannabinoid acids and their decarboxylated counterparts.

Steep Hill in the Lab

We are focused on measuring the purity and safety from all types of products containing active cannabinoids.



Testing & Analysis

We take the mystery out of medical cannabis through rigorous quality-standard protocols. We prove the safety, consistency, and potency of all cannabis products to bring guidance to distributors, cultivators, dispensaries, manufacturers, and consumers.

Genetic Services

Steep Hill offers genetic testing services to help our customers gain a better understanding of all aspects of cannabis genetics. We provide the cannabis industry, from growers and breeders to dispensaries and end users, with a suite of identification and diagnostic tools that help identify important genetic markers that can be used in breeding unique strains and in choosing the correct strain for medical purposes.

Consulting

We offer consulting services in the areas of cannabis safety, regulation, testing methodology, packaging including labeling, scientific development, processing and regulatory management.

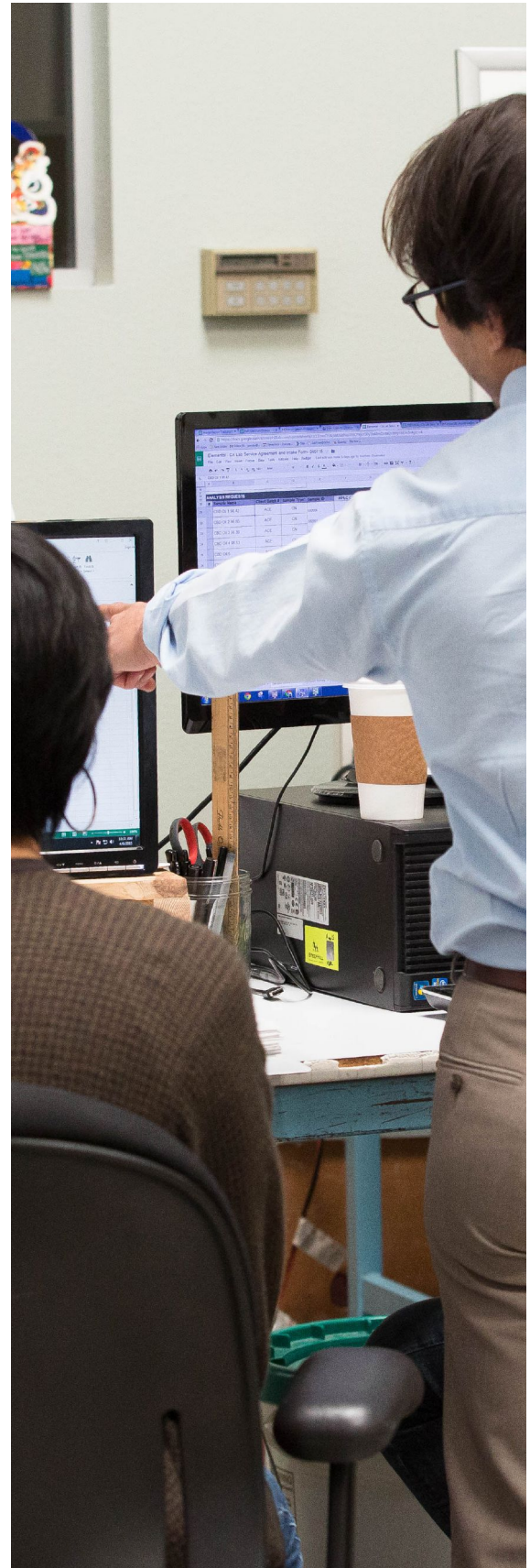
Steep Hill Verified™ is the highest level of quality assurance we offer for cannabis flowers, concentrates, and infused products.

The program offers collectives and producers a complete testing profile of their product at a discounted rate. This allows collectives and producers to insure they are supplying the best product available.

Certification sticker seals and package graphics are provided to clients as products meet our strict requirements and have passed our tests in compliance with all local and state regulatory standards. Steep Hill Verified seals confirm that a given product has passed all required safety and potency tests.

Tests Include

- Cannabinoid & Terpenoid Profiling
- Microbiological/Residual Solvent Analysis
- Mycotoxin Screening
- Pesticide Screening



Phenosight™

Our suite of genetic tests are designed to quicken breeding schedules, enhance efficiencies, and increase productivity.

Help Navigate the Patent Process

Curious about patenting your strain? We can help you succeed in applying for it.

Identify Unique Traits

Interested a special phenotype? We can identify its genetic distinction.

Chemical Profiling

Chemistry can help you understand the real-world implications of certain genes.

Custom Genetic Marker Analysis

Pursuing a specific trait? We can help you find genetic indicators for it.

Breeding Program Refinement

Our scientists are available for private consulting to help you increase the productivity and efficiency of your breeding program using our proprietary methods, tests, and systems.



Are You Hunting for CBD?

When you submit samples to us for sex testing via GenKit™, upon request we can also conduct a combination of chemical and genetic tests to help you identify high-CBD strains within a few days.

Steep Hill in the Field



Steep Hill is an innovative research and development lab that generates highly-differentiated products.

In addition to our lab testing services, we have been providing ground-breaking solutions to businesses and consumers in the cannabis industry since 2008.

QuantaCann2™

QuantaCann2™ produces laboratory-grade THC-A, D9THC, CBD, CBD-A, and moisture levels for cannabis flower and leaf samples from any location in the world (with an internet connection) in under sixty seconds

GenKit™

Using proprietary techniques and technology, Steep Hill scientists are able to swiftly and efficiently identify the males in any grow. We provide cultivators with plant sex identification within days to eliminate males from their gardens.

Strain Fingerprint™

Values and graphics are produced using cluster analysis of samples tested at Steep Hill, resulting in a composite average chemical makeup and unique strain-identifying iconography. Ranges take into account standard deviation to provide the most accurate models possible.

About Steep Hill



Founded in California in 2008, Steep Hill Labs, Inc. is a science and technology firm that has become the industry leader in cannabis testing and analytics.

With labs in five states, soon to be six with Oregon slated to launch in 2016, and a joint venture with the University of Technology in Jamaica, Steep Hill is the largest cannabis lab network in the world.

The company pioneered the first medical cannabis potency and micro-biological contaminants testing methodology for use in California—the first state to legalize medical cannabis. Steep Hill has since developed a variety of revolutionary cannabis testing products, including QuantaCann™, QuantaCann2™ and GenKit™. Steep Hill provides expert consulting services to many states, countries and municipalities, and the company is developing proprietary genetic testing, mapping and trademark protection services for the industry as well.

January 2008 Steep Hill opens the first Cannabis analytical lab in the U.S.	June 2008 Steep Hill markets first marijuana potency test in California.	March 2009 Steep Hill Identifies first high-CBD strain in CA medical marijuana supply.	April 2013 Steep Hill hired by WA for regulatory consultation and method evaluation.	February 2014 Steep Hill licensee opens in CO for Amendment 64 regulatory testing.
	October 2008 Steep Hill creates first microbiological safety screen for cannabis.	March 2011 Steep Hill develops QuantaCann™, the first remote instant on-site potency test.	June 2013 Steep Hill merges with Halent Scientific.	



New Mexico

8917 Adams N.E. Albuquerque, NM 87113
(505) 835-5602

The Steep Hill laboratory in Albuquerque, NM was awarded the first testing license by the NM Department of Public Health. Steep Hill New Mexico is designed to meet and exceed the testing requirements set by the state.

California (Headquarters)

1005 Parker St. Berkeley, CA 94710
(510) 562-7400

Steep Hill California provides extensive cannabis testing services to any cultivators, processors, dispensaries, collectives and Proposition 215-compliant medical cannabis patients with a valid recommendation and state-issued photo ID. Steep Hill California works with its customers to ensure product quality and optimize production methods.

Colorado

4890 Ironston St. Unit I Denver, CO 80239
(303) 375-9533

The Steep Hill laboratory in Denver, CO was the company's second testing and research facility. Located at the heart of the cannabis legalization movement and serving the largest population of legal cannabis consumers, Steep Hill Colorado provides extensive cannabis testing services to MED-licensed companies.

Nevada

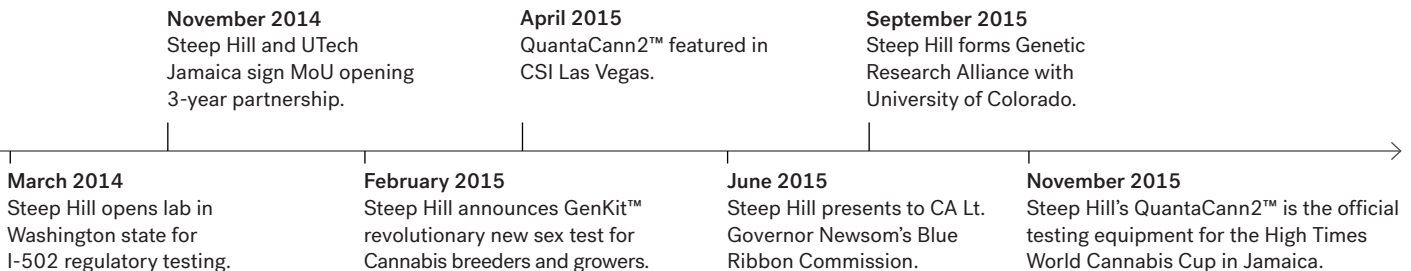
2009 Western Ave. Las Vegas, NV 89102
(702) 331-7820

The Steep Hill laboratory in Las Vegas, NV is a high-throughput facility designed to meet the intensive demands of the Nevada medical cannabis market. Recognized as Nevada's premier testing facility, Steep Hill earned one of the initial licenses for compliance testing.

Washington

720 Industry Dr. Tukwila, WA 98188
(253) 277-8936

The Steep Hill laboratory in Seattle, WA was our third testing and research facility. Steep Hill Washington is a fully licensed I-502 testing facility, with state of the art equipment and the best testing methodology in the industry.



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