



cannabis 101

Fourth Edition



PREFACE

Cannabis 101 is intended to be an approachable resource for everyone - whether you're an inquisitive patient or a curious parent. Covering everything from the anatomy of the cannabis plant to how cannabinoids and terpenes affect our bodies, Cannabis 101 is a guidebook for consumers looking to learn more about the blossoming world of cannabis.

On behalf of O.pen and Alchemy Naturals, we are excited to share our cannabis guidebook with you.

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01 CANNATOMY

While cannabis plants can be both male and female, the flower we consume is collected solely from the flowers of the female plant. Advances in plant genetics have allowed for cloning of the best genetics from the best cannabis strains. This helps to produce strains high in desired cannabinoid and terpene profiles, eliminate plant disease and, in many cases, the need for male-to-female cross pollination.



Fig. 1 Female Cannabis Plant



01 STEM

The plant's backbone that grows from the primary root.



02 NODES

The points along the stem where the fan leaves grow, typically in opposing pairs.



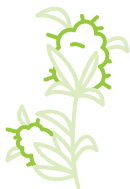
03 FAN LEAVES

Serve as the plant's solar panels to help produce energy. They make up the majority of the trim and are used in concentrates and other infused products.



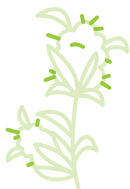
04 COLA *(koh-luh)*

Where the calyx/buds collect. The main cola is found at the top of the plant, with smaller bud sites forming below.



05 CALYX *(kal-iks)*

The bud of the flower where the highest concentration of trichomes can be found.



06 PISTIL *(pis-tl)*

The tiny strands of hair that emerge from the calyx help collect pollen from the male plant.

07 TRICHOMES

(*trik-ohms*)

The crystal resin covering the buds of the plant. These tiny, translucent, mushroom-shaped bulbs secrete aromatic oils called terpenes, as well as cannabinoids, like THC and CBD. Strains covered in these crystals will look more 'frosty' than others and are what give the buds their stickiness.



PLANT FATS / LIPIDS / PROTEINS

These are inactive components of the cannabis plant that are often discarded in the extraction process. After extraction, however, there are still cannabinoids in the plant fats that can be used in topicals and salves. Studies on cannabis plant fats, lipids and proteins are limited.

10 CANNABIS FACTS

- 01 Legalizing cannabis in all states would earn an estimated \$10+ billion in tax revenue.
- 02 Cannabis prohibition costs the US state and federal governments \$17.5 billion a year.
- 03 Eskimos have 100 words for snow; Americans have more than 200 for cannabis.
- 04 In many states, cannabis can only be purchased in dispensaries approved by the Department of Health.
- 05 Effects too intense? Chewing on a black peppercorn can help due to the presence of the terpene, Caryophyllene.
- 06 The word "canvas" is related to the word "cannabis." Historically, canvases were made of hemp.
- 07 The first item sold over the Internet was a bag of marijuana over 40 years ago. Stanford students used Arapnet (an early form of the Internet) to buy cannabis from their counterparts at MIT.
- 08 At time of publishing, The U.S. had over 3.7 Million MMJ patients, with new patients registering every day.
- 09 Since 2015, marijuana has become the fastest growing industry in the U.S. If marijuana becomes legal in all 50 states, the industry will become larger than the organic food market.
- 10 The cannabis industry is a massive job creator. Currently projected, the compound annual jobs growth rate is at 25%.

02 INDICA VS. SATIVA

Indica and sativa dominant strains are identified by their growing patterns based on the climate in which they originate. Generally speaking, these growing patterns tend to produce similar terpenes, and ultimately, the effects. While indica and sativa strains can vary based on these compounds, we will outline growing patterns, common flavors, and usual effects each dominance produces.



Fig. 2 Cannabis Indica Leaf Formation



INDICA

(in-di-kuh)

Indica dominant cannabis strains usually provide a body high, sometimes referred to as “couch-lock,” and are often used for stress relief due to their calming effects.

ENERGETIC

CALMING



**TYPICALLY A
MUSKY, EARTHY
TREE SAP SCENT**



**INCREASES
APPETITE AND
AIDS IN SLEEP**

GROWING FACTS



Originates from India and can thrive in cooler environments and indoor grows.



Short and full growing patterns due to the cooler and drier climates where they grow.



Because of these conditions, indicas typically produce a lower yield, but higher THC percentage.



SATIVA

(suh-tee-vah)

Sativa dominant cannabis strains often provide a cerebral, or “head” high. This high commonly imparts an uplifting and energetic feeling that can be accompanied by giddiness.

ENERGETIC

CALMING



**USUALLY A
SWEET, CITRUS
FRUITY SCENT**



**ENHANCES SENSES
& BOOSTS
CREATIVITY**

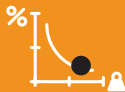
GROWING FACTS



Originates from countries along the equator. Thrives in warmer climates & outdoor grows.



Tall and sparse growing patterns due to abundance of light and ideal weather conditions.



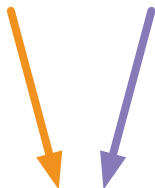
Because of these conditions, sativas typically produce a higher yield, but lower THC percentage.



Fig. 3 Cannabis Sativa Leaf Formation

HYBRID

Hybrid cannabis strains express both indica and sativa qualities. The degree to which one will feel psychological or physical effects is partly due to the more dominant strain.



ENERGETIC



CALMING



Strains are a more granular expression of the indica and sativa dominances. Strains are intended to possess unique characteristics such as THC content, terpene profiles, and color, all of which impact the user experience.

A long history of cross-breeding and marketing of the best strains has produced varied genetics among strains claiming the same name.

03 CANNABINOIDS

(*kuh-nab-uh-noids*)

Cannabinoids are a group of compounds found in cannabis flower. When consumed, these cannabinoids mimic the body's naturally produced endocannabinoids (for example, the body makes its own endocannabinoid *anandamide*⁷⁹, aka "the bliss molecule" - *Fig.4*), which are responsible for maintaining the body's health and homeostasis.⁹ There are over 60 cannabinoids in cannabis, but they can be classified into two broad categories: psychoactive and non-psychoactive.

Both psychoactive and non-psychoactive cannabinoids can fight inflammation and relieve pain.



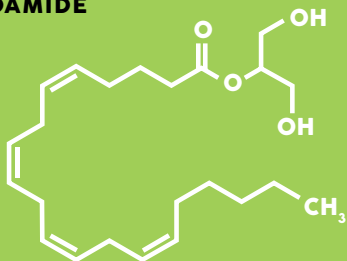
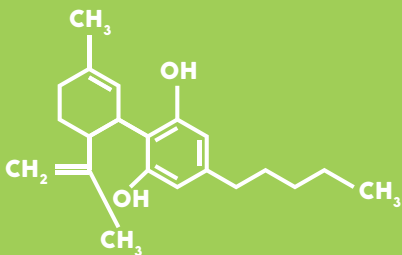
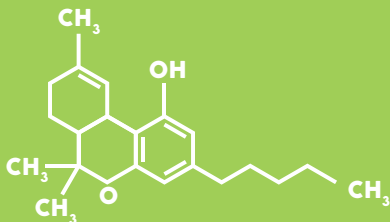
ANANDAMIDE**CBD****THC**

Fig.4 Anandamide and Cannabinoids



PSYCHOACTIVE

This class of cannabinoids is widely known for producing an intense euphoria known as the “high” feeling associated with cannabis. THC is chemically similar to anandamide, fitting into the same brain receptors inducing the same “bliss” response – *Fig.4.*

The most common psychoactive cannabinoids are THC, THCV, and CBN. Each of these affect the user experience differently. The vast majority of THC found in cannabis exists as THC-A, which becomes psychoactive only after undergoing a process called decarboxylation⁹.

These cannabinoids aren't just about feeling euphoric, though. Psychoactive stimulation is being used to treat imbalances within the brain that cause depression and ADHD, among others. THC has also been clinically researched to treat a number of other conditions, including cancer, IBS (irritable bowel syndrome), epilepsy, Tourette syndrome, ALS (amyotrophic lateral sclerosis), Huntington's disease, Parkinson's disease, glaucoma, and many more.



NON-PSYCHOACTIVE

Studies on non-psychoactive cannabinoids reveal an array of medical benefits. The most common non-psychoactive cannabinoids are CBC, CBG, CBL, and CBD, which is the most well known. CBD is the most abundant cannabinoid and makes up roughly 40% of cannabis resin.

Non-psychoactive doesn't mean powerless. CBD packs potent antioxidant and anti-inflammatory effects, and has been clinically proven to treat anxiety and nerve pain.

RESEARCHED CONDITIONS HELPED BY:

PSYCHOACTIVE

- Depression
- ADHD
- Cancer
- IBS
- Epilepsy
- Tourette Syndrome
- ALS
- Huntington's Disease
- Parkinson's
- Glaucoma

NON- PSYCHOACTIVE

- Anxiety
- Movement Disorders
- Nerve Pain
- Cancer

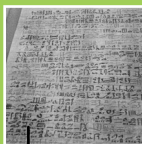


CANNABIS' MEDICAL HISTORY

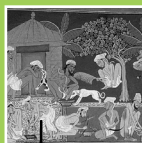
Cannabis is one of the world's oldest cultivated plants. As far back as 4,700 years ago we find recorded evidence of medicinal use of cannabis. Many 19th century physicians used cannabis for health, with documented use for a range of ailments including tetanus to mental disorders. In 1851, cannabis was included in the 3rd edition of the



8000+ BC
Evidence
of hemp
cultivation



2679ish BC
Documented
use of cannabis
as medicine



480 BC
Vaporized
cannabis used
for ritual and
pleasure

Pharmacopoeia of the United States (a standardized list of pharmaceuticals).

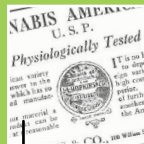
From ancient history to modern times, cannabis has been widely used across cultures as both a multi-purpose medicine and an enjoyable life enhancer.



200 BC
Smoked
throughout
Asia



1500 AD
Commonly
smoked and
consumed as
an edible



1851 AD
Cannabis
listed in United
States' book of
pharmaceuticals

OTHER CANNABINOIDS

While THC and CBD are the most well known and researched, over 60 cannabinoids have been identified in cannabis, all with their unique array of benefits.

CBG CANNABIGEROL

(can-uh-bidj-uh-rawl)



Mood booster

CBG may help increase anandamide, the body's natural happiness chemical. It blocks the enzymes that break down anandamide, so it's more available to our bodies.

CBN CANNABINOL*(kuh-nab-uh-nawl)**Calming sedative and natural sleep-aid*

Cannabinol affects the brain, but it's so gentle it's usually considered non-psychoactive. CBN's effects are slightly more than CBD, but far less than THC. Rather than stimulating the mind, CBN relaxes, sedates and helps with sleep. Studies indicate that its sedative quality may be a result of the entourage effect (a combination of THC, CBD, and CBN working together) rather than CBN alone. CBN (like CBD) also softens the intensity of THC.

When THC is exposed to the air, it oxidizes and becomes CBN, which is why cannabis that has been left out will have less potent effects when consumed. CBN shouldn't be mistaken as simply stale cannabis, though! It's also a strong antibacterial agent against even antibiotic resistant bacteria strains. Like most cannabinoids, CBN also packs powerful anti-inflammatory properties.

CBC CANNABICHROMENE

(can-uh-behk-kro-meen)



Cancer fighting cannabinoid

Most noteworthy about CBC's is its cancer fighting power. While CBG is the strongest at fighting tumors, cannabis contains a far higher concentration of CBC making.

Research also shows a positive effect on neural stem cells, which are essential for brain function. CBC supports these cells in directing brain signals to the correct location and defending against inflammation and stress. This helps fight conditions that lead to many neurological diseases, including Parkinson's and Alzheimer's.

Cannabichromene is also antibacterial, with amazing potential against even antibiotic resistant "superbugs."

CBC's entourage effect is also interesting. While non-psychoactive alone, when combined with THC and CBD, it becomes an antidepressant. With its variety of benefits, horticulturists are using selective breeding techniques to develop cannabis strains packed with even more of the cannabinoid.

CBDA *CANNABIDIOLIC ACID*

(can-uh-bid-ee-ah-lick)



Nature's anti-inflammatory

While many cannabinoids are anti-inflammatory, CBDA excels because it specifically blocks the enzyme (COX-2) that triggers inflammation when injured or fighting disease. This makes CBDA chemical structure remarkably similar common nonsteroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen.

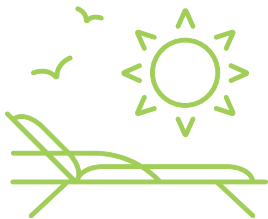
CBDA also seems to balance neurotransmitters such as serotonin (which makes us calm and happy), so it could also be an effective treatment for depression and anxiety.

CBDV *CANNABIDIVARIN*

(can-uh-bid-uh-vahr-en)

CBDV was long considered an inactive part of the plant, but it turns out cannabidivarin helps regulate the nervous system. CBDV is proven effective in treating seizures, epilepsy, Rett syndrome, and muscular dystrophy.

It's even being explored for positive effects with autism, although exactly how CBDV works in the brain is not yet fully understood.



The nervous system regulator

CBDB & THCB

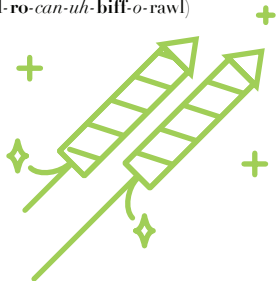


Newly discovered superpowers

Much mystery surrounds these new discoveries. What we know so far is that small molecular differences make CBDB and THCB even more proficient at connecting to our cannabinoid receptors. This means they could offer even more powerful effects and health benefits than other cannabinoids.

THCP TETRAHYDROCANNABIPHOROL

(tet-ra-hyd-ro-can-uh-biff-o-rawl)



33x more effective than THC

THCP is a variant of THC, with nearly the same chemical composition. However, its unique shape helps it bind to cannabinoid receptors, making THCP as much as 33 times more effective than THC! This discovery has researchers wondering if THCP is playing a bigger role behind the scenes (with THC stealing the credit).



CHECKLIST OF CANNABIS RESEARCH

- ✓ **CANCER FIGHTER**
- ✓ **ANTI-INFLAMMATORY**
- ✓ **ANTIBACTERIAL**
- ✓ **ANTI-DEPRESSANT**



TERPINEOL



LIMONENE



LINALOOL



PINENE



CARYOPHYLLENE



CARENE



GERANIOL



MYRCENE



HUMULENE

04 TERPENES

(*tur-peens*)

In its most fundamental form, a terpene is an organic compound found in plants, which is responsible for scent and taste. In cannabis, terpenes are located in the trichomes and are unique to each strain's profile. Terpenes' flavors and aromas alone can enhance the experience and overall therapeutic effects of cannabis strains. Additionally, research surrounding the entourage effect (see pg. 36) shows that terpenes also chemically enhance cannabinoids' effect on our bodies.

Currently, over 100 terpenes have been identified in cannabis. The following pages provide a brief description for some of the most common terpenes and are color-coded based on the dominance (*indica*, *sativa*, & *hybrid*) with which they are most aligned.

TERPENES IN THE WORLD:



SO FRESH, SO CLEAN

You may recognize the citrusy smell of house cleaners. This is due to the terpene, Limonene, which is great for breaking down dirt and grime.



HIGH STANDARDS

The terpene, Myrcene, is a strong sedative that can be found in mangos. Some say if you eat one prior to consuming cannabis, it can intensify the experience.



BEER AND BUDS

Don't be turned away from flower that smells like beer. Humulene is a terpene found in both hops (used in beer) and cannabis plants.



SCENTS OF RELAXATION

Ever wonder why massages use lavender lotions or oils? Lavender contains the terpene, Linalool, which helps relax the body and mind.



QUIT BUGGIN' OUT

Bugs are rarely a welcomed guest. Citronella candles and other common insect repellents are effective largely due to the terpene, Geraniol.



LIMONENE

(lim-uh-need)

Limonene is highly concentrated in citrus fruit rinds and is largely responsible for their aromatic scent. Studies in citrus fruit have uncovered a variety of Limonene's medical benefits including aiding digestion, alleviating depression, and anti-bacterial activity. It also has anti-proliferative properties, meaning that it can help prevent the spread of malignant cells, making it promising for cancer treatment research. Aside from the potential medical benefits, consuming cannabis strains high in Limonene can promote an overall uplift in mood.



**CITRUS SCENT
AND FLAVOR**



**UPLIFTING
OVERALL MOOD**



**MEDICALLY
BENEFICIAL**





PINENE

(pahy-noon)

Pinene occurs naturally in two forms: alpha-Pinene and beta-Pinene. Both forms are important constituents of pine resin and can be found in the resins of many other conifers, as well as non-coniferous plants. Pinene promotes alertness and memory. Studies have found that Pinene has anti-inflammatory properties, which can be used as both a topical antiseptic and a bronchodilator to open up airways. It can also reduce the size of some cancerous tumors.



**PINE RESIN
SCENT**



**INCREASES
ALERTNESS**



**HELPS OPEN
LUNGS**





CARYOPHYLLENE

(kar-ee-aw-fuh-leen)

The terpene Caryophyllene (found in the forms of beta- or trans-Caryophyllene) has a peppery scent and is found in many spices, like black pepper and clove. Caryophyllene is unique in its ability to selectively bind to CB2 receptors, but not CB1 receptors, meaning that Caryophyllene does not produce psychoactive effects.

Caryophyllene's affinity to CB2 receptors gives it anti-inflammatory properties, which is why it's often found in topicals and salves.



**USED IN
TOPICALS**



**NON-
PSYCHOACTIVE**



**PEPPER AND
CLOVE SCENT**





HUMULENE

(hyoo-myuh-leen)

Humulene (alpha-Humulene and alpha-Caryophyllene) gets its name from *Humulus lupulus*, or common hops. It can comprise as much as 40% of the essential oil. It's also found in cannabis sativa strains where it exhibits its earthy, woody scent, as seen on the following page.

Humulene is being studied as an anti-inflammatory and analgesic (pain reliever). While cannabis typically acts as an appetite stimulant, Humulene has the unique ability to serve as an anorectic (appetite suppressant), making it promising for weight loss.



**COMMON
HOPPY AROMA**



**STRONG PAIN
RELIEVER**



**APPETITE
SUPPRESSANT**



05 ENTOURAGE EFFECT

The entourage effect is the concept of whole plant medicine, meaning that cannabinoids taken together enhance the benefits of each other, while reducing any negative effects. While beneficial on their own, cannabinoids are a complex group that function differently when taken in different combinations. When working together as a group, or with an "entourage" so to speak, the results are more powerful than a single cannabinoid alone.

For example, while THC is the only cannabinoid recognized as psychoactive, other cannabinoids can either soften or enhance its impact. Consuming THC alone can be too stimulating for some and may create anxiety in some users. CBD steps in and tempers THC's interaction with the endocannabinoid system to eliminate any anxiety.

CANNABINOIDS AND TERPENES COMPLIMENT ONE ANOTHER, BOOSTING THE OVERALL BENEFICIAL EFFECTS.



Cannabis products that are “full spectrum” contain the full array of cannabinoids present in that particular strain to take advantage of the entourage effect.

06

CANNABIS & YOUR BODY

ENDOCANNABINOID SYSTEM

ANTIOXIDANT POWERHOUSES

CANNABIS AS A PAIN RELIEVER

STRESS & EMOTIONAL TRAUMA

CANNABIS AND CANCER



THE ENDOCANNABINOID SYSTEM

Endocannabinoids and cannabinoid receptors form the *endocannabinoid system* (ECS), which influences the body's communication system and therefore nearly every bodily function. Endocannabinoids relay messages about the body from one system to another, such as alerting the immune system of invading bacteria, or using pain as a signal of injury or disease.

To understand how cannabinoids function, picture a vast information highway, with messages and signals traveling throughout the body. Cannabinoids are like the traffic cops – slowing down some messages and letting others through – to control the flow of communication. Cannabinoids can help make sure a signal gets to the right destination, or prevent too many from overloading the body and causing a 'traffic jam'.



INVADING BACTERIA > ECS > IMMUNE SYSTEM

BRIDGE BETWEEN BODY & MIND

Brain cells and neurons, communicate by sending chemical messages, or signals. These coordinate everything we feel, think and do. These messages and signals are carried by chemicals called *neurotransmitters* which travel across a small gap between brain cells, called the *synapse*. This starts a chain reaction, where the message is relayed from neuron to neuron, cell to cell, until it reaches its intended part of the body.

Cannabinoids form a literal bridge between mind and body.



Endocannabinoids and the cannabinoids from cannabis attach to neurons sending and receiving messages and help make sure the message is correct and gets delivered to the right place.

Cannabinoids also calm down overexcited neurons, preventing them from needlessly repeating the same messages over and over. If the body overreacts and keeps repeating messages, it becomes run down and fatigued. This overreaction of the body is a simple way to understand many autoimmune disorders, and how cannabis can help.

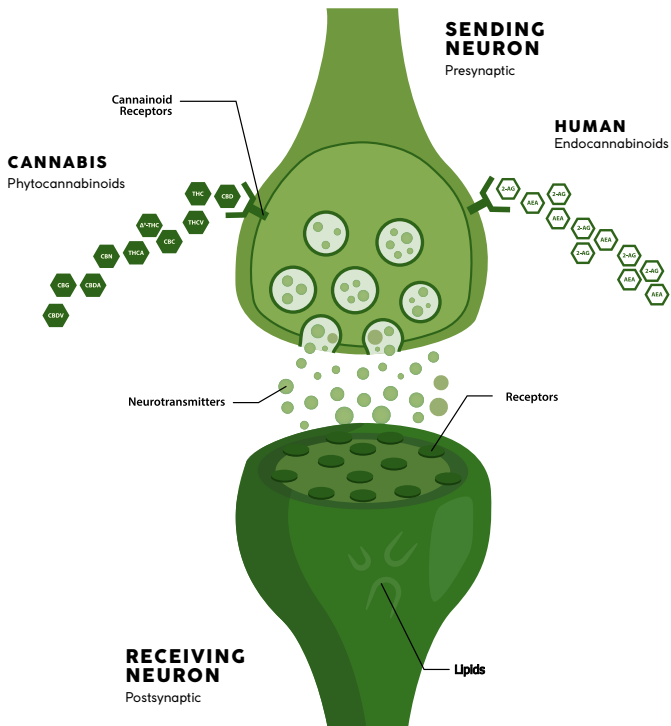


Fig. 6 Phytocannabinoids vs Endocannabinoids

MIND & BODY BALANCE

The endocannabinoid system is responsible for regulating the communication and reaction of the entire body, all with the purpose to maintain homeostasis. Homeostasis means that the body is in balance and functioning properly.



Homeostasis is a state of balance essential for mental & physical health

A lack of homeostasis means that something is physically wrong and the body must work to correct the problem, such as fight against bacteria or repair an injury. Sometimes though, the body overreacts to triggers (disease, injury, or stress) and maintaining homeostasis is a constant struggle, resulting in autoimmune disorders, chronic fatigue, depression and anxiety. Cannabinoids can help prevent the mind and body from overreacting, as well as more quickly regain and maintain balance.



ANTIOXIDANT POWER HOUSES

Just like healthy superfoods, cannabinoids are full of powerful antioxidants. Within the cannabis plant itself, cannabinoids protect the leaves and flowers from ultraviolet radiation, neutralizing harmful free radicals. Antioxidants are important to health in humans as well, as free radicals are known to cause cell aging, cancer, and impaired healing.



FRUITS



VEGETABLES



**DARK
CHOCOLATE**



NUTS



CANNABIS AS A PAIN RELIEVER

Cannabinoids are proven effective against a variety of pain types — so effective, in fact, that many pain patients are replacing opioids (and their dangerous side effects) with cannabis. In 2017, the *U.S. National Academy of Sciences, Engineering and Medicine* concluded there was “substantial evidence” cannabinoids were effective for chronic pain, both from inflammation and nerve disease.



INFLAMMATORY PAIN

Cannabinoids and terpenes are anti-inflammatory powerhouses! By regulating how the body responds to triggers like an injury or autoimmune disease such as arthritis, cannabis can relieve pain caused by inflammation.



NEUROPATHIC PAIN

Cannabinoids relieve nerve pain in basically the same way topical anesthetics like novacaine operate. Since cannabinoids control the body's communication system, they can intercept pain signals before they reach the brain, and pain signals that don't reach the brain aren't felt.



STRESS & EMOTIONAL TRAUMA

Emotional and mental stress also take their toll on the physical body. The endocannabinoid system helps by processing anxiety, stress and traumatic life experiences.

The endocannabinoid system is part of our natural coping mechanism – it helps us to leave the past behind.

PTSD sufferers have trouble archiving traumatic events as memories. Lingering learned fearful responses underlie most symptoms; the body doesn't understand that it's no longer in danger. Stimulating the endocannabinoid system can be a worthwhile part of treatment. Here's why: Processing fearful memories is connected to a particular cannabinoid receptor (CB1) in the brain. Activating this receptor seems to kickstart the mind to work through then "file away" the fear response that is no longer needed.

Another way cannabis can help the body emotionally heal is by regulating stress hormones (cortisol and norepinephrine in particular).

HOW CANNABINOIDS CAN HELP WITH PTSD



Before: *Living with PTSD is like doing the same work over and over because your brain keeps putting a traumatic event on your desk but never lets you “file it away.” The part of the brain dealing with here-and-now ends up cluttered with painful past events, and so it keeps feeling the trauma as if it just happened.*



After: *The endocannabinoid system helps the brain appropriately archive past trauma, clearing your mind’s workspace so it can focus on the present.*





CANNABIS & CANCER

Cannabis is a common therapy for the pain and nausea accompanying cancer treatments, such as radiation and chemotherapy. But what can cannabinoids do for cancer itself?

In 2017, the *National Academies of Science, Engineering, and Medicine*, concluded that “there is evidence to suggest that cannabinoids (and the endocannabinoids system more generally) may play a role in the cancer regulation process.”



Cannabis is shown to help stop and reverse tumor growth.



Cannabis can improve the quality of life while living with cancer, such as aiding sleep, relieving pain, and stimulating the appetite.

Cannabinoids may be helpful in fighting cancer because they possess two anti-tumor effects. One is through directly inhibiting cell overgrowth, and the other by preventing a tumor from spreading (inhibiting metastasis).

THC has been specifically researched for its effect on breast cancer cells, where THC is found to kill cancerous cells before they can reproduce.

PAIN ALIEVIATION



APPETITE STIMULANT



GENERAL WELL-BEING



6 FACTS ABOUT THE ENDOCANNABINOID SYSTEM

- 01** Endocannabinoids are produced by almost every organism in the animal kingdom.
 - 02** All vertebrates have an endo-cannabibnoid system – mammals, birds, reptiles, amphibians, fish, and so on!
 - 03** The endocannabinoid system is incredibly old, having evolved over 500 million years ago.
 - 04** Scientists first discovered human endocannabinoids in the 1990s.
 - 05** Cannabis causes effects, in part, by mimicking our own naturally produced endocannabinoids.
 - 06** Cannabinoid receptors are located throughout the body not just the brain and central nervous system, including skin, immune cells, skeletal, muscle, and blood vessels.
-

07

SOIL TO OIL PROCESS



RAW MATERIAL SOURCING

EXTRACTION

REFINEMENT

QUALITY ASSURANCE TESTING





01 RAW MATERIAL SOURCING

A premium cannabis oil starts with the ingredients. A cannabis extract is only as good as the raw material that goes into the extraction process. Consumers often look for flavor and/or potency in an extract, which is largely dependent on the quality of the terpenes and cannabinoids in the starting material.



SPECIFIC GROWS PRODUCING LIMITED, HIGH-QUALITY BATCHES, CAN BE FEATURED ON PACKAGING



JUST LIKE A FINE WINE, CANNABIS PRODUCTS ARE RELIANT UPON THE QUALITY OF STARTING MATERIAL



INDOOR & OUTDOOR CAN BOTH PRODUCE QUALITY MATERIAL



02 EXTRACTION

Just like different tools are used for different jobs, different extract processes produce different types of extract. These extracts can include oil, wax, distillate, rosin, sauce, live resin, bubble hash, isolate, shatter, tincture, & nano-emulsion. An extract is determined based on the type of product it will become and how that product will be consumed.



03 REFINEMENT PROCESS

Refinement is used to remove plant lipids, waxes, pigments, chlorophyll, and other undesirable components from terpenes and cannabinoids. The following section includes common refinement processes: winterization, filtration, decarboxylation, and distillation.

REFINEMENT PROCESSES:



WINTERIZATION

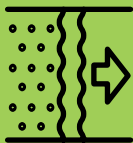
This process freezes the raw extract using solvents, such as ethanol.

The solvent is used in order to filter the cannabinoids and the less volatile terpenes from unwanted plant matter, like waxes and other lipids.

When freezing, layers of the plant fats are separated along with waxes, lipids, and other plant matter.



- ✗ PLANT FATS ARE REMOVED**
- ✗ WAXES, LIPIDS, AND OTHER PLANT MATTER ARE SEPARATED**
- ✓ TRANSPARENT OIL READY FOR THE NEXT STAGE OF FILTRATION**



CARBON FILTRATION

This process is typically the next step after winterization, intended to further purify and clarify the extract. This process removes unwanted color pigments, like chlorophyll, anthocyanins, water-soluble pigments, and undesirable flavors that may reside from soil used in the growing process. After filtration, the remaining solvents are removed through various separation processes.



DECARBOXYLATION

The “decarb” process allows for the conversion of the non-psychoactive cannabinoid THC-A to the psychoactive compound Δ^9 THC. This conversion happens when the THC-A is exposed to heat. Too much heat will damage some of the cannabinoid molecules and terpenes, reducing the potency and flavor. If not enough heat is used, some of the THC-A molecules will not activate. For this reason, it is popular to use a low and slow method to decarboxylate oil to ensure terpenes remain intact and the oil reaches its full psychoactive potential.



DISTILLATION

Often referred to as “short path molecular” or “fractional” distillation, this method allows you to distill terpenes and purify cannabinoids by discarding any remaining plant fats and coloring. What’s left is an oil that is around 90% pure cannabinoids with unmatched clarity and taste. Further isolation of a single cannabinoid can be performed using preparative liquid chromatography or crystallization. Through isolation, cannabis oils can be engineered more effectively to better serve the needs of patients and consumers.



**THE FINAL STEP TO
IMPROVING PURITY
AND CLARITY**



**YOUR OIL SHOULD BE
CLEAR & TRANSPARENT,
WITH GOLD HUES**





04 QUALITY ASSURANCE TESTING

Before any products hit the shelves or are consumed, it is important to inspect all aspects of the finished oil, including cannabinoid and terpene levels. Typically, the starting raw material is tested for toxins, such as pesticides, before going into extraction and then again when the oil is finished. Having measures that monitor extraction and refining efficiencies during the manufacturing process is imperative to ensure high quality of finished products.

Some pesticides may not be detected when the flower is tested, however, pesticides can show up once the material has been concentrated. This is why it is important to test multiple times.

PROCESS CHECK



BEFORE



DURING



AFTER

USE YOUR COMMON SENSE

A guide to buying cannabis

01



LOOKS LIKE

When first looking at cannabis, be aware of how "frosty" each flower looks. Frost usually means high trichome count, which means more flavor and stronger effects.

02



FEELS LIKE

Correctly cured flowers should be easy to break up between your fingers, but not so dry it turns to powder. Wet flower usually means there is remaining moisture, which can effect the weight of your purchase.

03



SMELLS LIKE

When first smelling the flower, you should follow your nose and immediately look for your favorite smells.

04



TASTES LIKE

Taste should be similar to the smell. Clean smoke also attributes to a cured flower. Make sure you aren't getting any metallic, moldy, or salty flavors.

05



SOUNDS LIKE

Cannabis doesn't really sound like anything, so we suggest just putting on some jams you love while sparking up your favorite strain.

08 EXTRACTION METHODS

CO₂ EXTRACTION

HYDROCARBON EXTRACTION

ICE EXTRACTION

ROSIN EXTRACTION

WHAT ARE SOLVENTS?

Solvents are compounds used to aid in the extraction process, which are later purged from the final product. Some common solvents include carbon dioxide, butane, and propane.

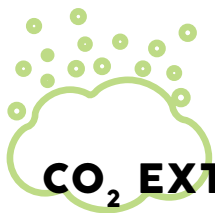
Whether to use solvent or solventless cannabis extracts is up to personal preference: one is more physical and one is more chemical. For pure cannabis products, one might prefer solventless. However, high-quality solvent extracts can offer products with a more terpene forward flavor. The ultimate decision is based on personal preference as well as availability in your area.

SOLVENTLESS PROCESS



SOLVENT PROCESS





CO₂ EXTRACTIONS

This process involves using carbon dioxide (CO₂) as a solvent. It is typically chosen for its efficiency and ability to separate cannabinoids, terpenes, and other non-polar components from the plant material. CO₂ extraction can be done at subcritical and supercritical states. Subcritical is effective at isolating volatile terpenes, ensuring that flavor remains intact in the final extract. Supercritical extraction is used to separate cannabinoids from the non-polar components of the plant. What's left behind is a pure cannabis oil, free of unnecessary or unwanted elements.

A lot of vaporizers utilize CO₂ extractions in order to control the viscosity of the oil and ensure it functions properly with the vaporizer device. CO₂ extraction is also commonly used to extract cannabis terpenes, which are then reintroduced into cannabis oil from other extraction methods.



HYDROCARBON EXTRACTIONS

Hydrocarbon extractions use propane or butane as a solvent. This extraction process is chosen for its efficiency as well as the ability to extract from frozen material. Capable of extracting any type of plant material, the hydrocarbon extraction process is unique in that it can process fresh frozen material. Fresh frozen material is harvested from the grow and immediately frozen. When fresh plants are frozen immediately, it preserves volatile terpenes more effectively than a dried or cured plant, leaving behind a very flavorful extract.

TYPICAL HYDROCARBON EXTRACTION RESULTS:



**WAX &
SHATTER**



SAUCE



LIVE RESIN



ICE EXTRACTIONS

Ice extraction is a solventless process, where cannabis flower is sifted through a series of screens using freezing cold water and ice cubes in order to separate the trichomes from the plant matter. Trichomes are the part of the plant that produce cannabinoids, terpenes, and other essential molecules. This method is considered to be a safe and simple way to extract cannabis concentrate and is often used as a DIY method.

TYPICAL ICE EXTRACTION RESULTS:



ICE HASH



BUBBLE HASH



WATER SIFT



ROSIN EXTRACTIONS

Rosin extraction is another solventless process. Rosin refers to an extraction process that utilizes a combination of heat and pressure to instantaneously squeeze resinous sap from the initial starting material. This is done by taking two heated plates and pressing them together with the plant material in the middle. This method is also considered to be a safe and simple way to extract and is one of the more popular DIY extraction methods.

SIMPLE ROSIN PROCESS



09 CONSUMPTION METHODS

VAPORIZERS

FLOWER

CONCENTRATES

TOPICALS

EDIBLES



VAPORIZERS

Vaporizing cannabis oil has grown in popularity over the past few years. Vaporizing allows for the highest efficacy of any delivery method. Some products allow for 95% efficiency in consumption (meaning little material is wasted) and provide users with a consistent, measurable dose with each puff. Vaporizing cannabis provides an experience that is easier on the lungs and free of smoke and odor.



VAPORIZATION ALLOWS FOR UP TO 95% EFFICIENCY IN CONSUMPTION, THE HIGHEST METHOD IN CANNABIS.

POTENCY



IMMEDIATE EFFECTS



CONVENIENCE



BENEFITS OF VAPING



Q1 SINCE NO MATERIAL IS BURNED, VAPING IS AN EFFICIENT, DISCREET, AND HEALTHIER ALTERNATIVE TO SMOKING.



Q2 EACH PUFF EMITS A MEASURED DOSE, SO CONSUMPTION CAN BE EASILY MONITORED.



Q3 VAPORIZERS HEAT OIL TO THE PRECISE TEMPERATURE NEEDED TO RELEASE THE ACTIVE INGREDIENTS.



Q4 INHALATION IS THE QUICKEST WAY TO DELIVER CANNABIS RELIEF, WITH EFFECTS THAT CAN BE FELT ALMOST INSTANTLY.



Smoking cannabis flower is the original form of consumption and is still the most popular method. Flower can be inhaled through a variety of methods - joints, blunts, pipes, bongs, etc. With these methods the cannabis flower is heated until it combusts and produces smoke, which can then be inhaled. The advantages of smoking flower are that the effects are instantaneous, dosage is easy to regulate, and it's typically an inexpensive method. These traditional methods of smoking, however, also mean inhaling potentially harmful carcinogens found in smoke.

POTENCY**IMMEDIATE EFFECTS****CONVENIENCE**

	SMOKING	VAPING
CONSUMPTION	 Carcinogens, smoke, and tar	 Pure, smoke-free vapor
PRODUCT USE	 Significant terpene & cannabinoid loss	 Maximized terpenes & cannabinoids
EXPERIENCE	 Harsher, smoke taste	 Full range of flavors

Using a vaporizer to consume flower provides all the benefits of smoking without the unhealthy toxins from smoke or lung irritation. Convection vaporizers are the most efficient and provide the purest vapor since they use indirect heat to activate the flower.



CONCENTRATES

Concentrates are produced in a variety of forms, including hash oil, budder, shatter, wax, sauce, and distillates, which can be consumed in a variety of delivery methods. A popular method of concentrate consumption is “dabbing,” which can be complicated and involves a butane torch or electric nail (e-nail). Concentrates are often highly potent and can contain as much as 90%+THC. Concentrates may be advantageous for those requiring strong and instant relief. There are concerns that concentrates, when made with harmful solvents, are at a higher risk of containing residual metals that can have negative impacts on one’s health. Care should be taken when using concentrates because of the level of potency.

POTENCY



IMMEDIATE EFFECTS



CONVENIENCE





Topicals can be found in the form of lotions, patches, balms, oils, and tinctures. Topicals are applied directly to the skin. In this method, cannabis is absorbed through the skin's pores and attaches to CB2 receptors. Since cannabinoids don't cross the blood-brain barrier, the effects are therapeutic rather than psychoactive. This makes topicals useful for those who want to target specific areas of inflammation, pain, or soreness without experiencing the cerebral effects.



TOPICALS ARE AVAILABLE IN A VARIETY OF FORMATS - LOTIONS, PATCHES, BALMS, OILS - AND FORMULAS TO HELP WITH SPECIFIC CONDITIONS

POTENCY



IMMEDIATE EFFECTS



CONVENIENCE





Edibles have evolved over the years from unmeasured doses in homemade brownies to a variety of consistently dosed cookies, chocolates, candies, and other ingestibles. Many medical patients prefer this method of consumption for its accurate dosing and simple delivery method. Edibles are digested through the small intestine and then processed through the liver; this process converts the $\Delta 9$ THC to $\Delta 11$ THC, which produces a longer lasting and more psychoactive high.



**BITE SIZED ADVICE:
START LOW, GO SLOW
(EDIBLES HAVE A DELAYED EFFECT)**

POTENCY



IMMEDIATE EFFECTS



CONVENIENCE





FIRST BITES

A beginner's guide to consuming edibles.

01



TAKE IT SLOW

Start with small doses and give plenty of time to digest (at least 90 minutes) before consuming more. Remember that it can take as long as three hours before you can feel an edible activate.

02



SET AND SETTING

Consider trying with a friend or in a relaxing environment. However you do it, just make sure you're not driving soon.

03



JUST IN CASE...

Be ready in case you accidentally over consume by having a high CBD product on hand (CBD tempers the effects of THC). If you do "overeat," drink plenty of water. It's also suggested to add some fresh lemon juice since citrus relieves any unpleasant effects from taking too much.

WHY WE LOVE EDIBLES

Ingested THC enters and interacts with your body differently, which means edibles may feel differently than other forms of cannabis. Many report a more intense relaxation in the body with edibles (in contrast, inhalation methods often give stronger cerebral effects).



DISCREET

Since edibles take longer to affect the body, they allow the user to consume ahead of time and offers more discretion than smoking.



EFFECTIVE

Everyone is different, and some simply prefer the way edibles make them feel. Edible eaters report more effects in the body than smoking, often causing a stronger relaxation feeling.



TASTY

When something is highly delicious and deliciously high...edibles are loved simply for being tasty.



HEALTHY

Smoking isn't an option for everyone, and edibles allow people with respiratory conditions to enjoy the health benefits of cannabis.

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Disclaimer: The information in this guide is based on limited scientific research. Studies on cannabis are constantly evolving, for this reason, we will continue to update this guide as necessary.



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