

Endurance Athlete's Guide to CBD

What it is, how it works and how
you can use CBD to
perform your best.





INTRODUCTION

NO MATTER WHAT YOUR SPORT, QUALITY CBD CAN IMPROVE YOUR TRAINING, RACING AND RECOVERY



To the Endurance Athlete:

Whether you are just starting out in an endurance sport or have spent years training, racing and exploring the limits of your body, we all share a common love for the outdoors, the seemingly weird and contradictory enjoyment of pain, challenge and the connection we feel to the world that surrounds us.

Put so eloquently by Olympian and coach Chris Hauth, "*We are hardwired for nature, to be outside, to live connected with our environment, to feel it, to play and struggle in it.*"

A crucial part of being able to stay outside and stay in the game is the proper care and nurturing of our body. We ask a lot of our body in running tens of miles or biking for hours on end or climbing and jumping for miles at a time. Investing in our body's overall ability to handle the miles & stress is an ongoing quest.

Now we have a new tool to help us perform better, recover faster and alleviate pain in a safe and natural way - Cannabidiol or CBD for short.

Amidst all the headlines, claims and hype around CBD, we noticed that while many athletes are interested in CBD there's much confusion about where to start, who to trust and how it can actually help them.

So we decided to write this guide to help endurance athletes make the best decisions about adding CBD to their regimen in order to help them do their sport for life. We hope you find this a valuable resource that helps you get started on the right path with CBD.

Yours in sport,

Jay OHare & Dave Wittlinger
Founders Venga CBD

This guide is divided into 6 chapters.

Chapter 1 - CBD Basics & FAQs

In Chapter 1, we'll go over the basics of CBD Oil, including what it is and where it comes from. We'll also provide answers to some of the most frequent questions asked by those new to CBD.

Chapter 2 - CBD & Your Body

In Chapter 2, we'll take a look at the active ingredients in CBD oil and how they affect the endocannabinoid system and human body on a whole.

Chapter 3 - CBD for Endurance Athletes

In Chapter 3, we'll look deeper into what CBD might mean to you as an athlete — and it works with your body to help you perform your best!

Chapter 4 - Getting Started with CBD

In Chapter 4, we'll get you started by providing some advice on how to choose the right product for your needs and how to find a trustworthy source.

Chapter 5 - How to Take CBD

In Chapter 5, we'll go over the most common types of products that contain CBD. We'll also described the best, most effective way to take CBD oil.

Chapter 6 - CBD Research

In Chapter 6, we'll dive into what the latest research says about CBD. Leading researchers have uncovered some pretty amazing health benefits!

The first three chapters provide a good foundational knowledge of CBD, while the second three chapters progress into specifics and actionable info. So if you're anxious to get started taking CBD, feel free to skip ahead to the second half!

We also recommend beginning at Chapter 4 if you're already taking CBD oil. That way you can make sure you've got the right product for you, learn how to properly use it, and determine how much CBD you should be taking. Once you know how to proceed with your own personal dosing plan, you can always go back through the basics described in Chapters 1, 2, and 3.

MEDICAL DISCLAIMER

Before we begin...

The Federal Food, Drug, and Cosmetic Act requires that we inform you that the efficacy of CBD oil products has not been confirmed by FDA-approved research as a treatment for any medical condition. The information in this document is not intended to diagnose, treat, cure or prevent any disease.

This guide contains information that will help you be informed about the how and why of CBD oil. It's also important that you seek the advice of a qualified medical professional who is well versed in the therapeutic use of CBD before beginning use.

While this guide is not intended to provide medical advice, it is intended to provide you a comprehensive understanding from which your appreciation for CBD, and its health benefits, can grow and expand.

With that, let's get started!





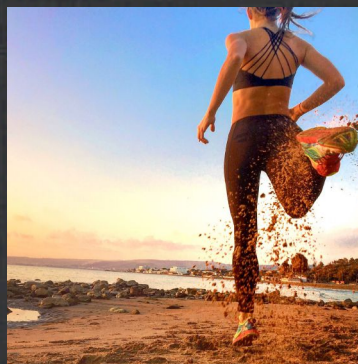
CHAPTER 1

CBD OIL BASICS & FAQs

Cannabidiol or CBD is a non-intoxicating component of the cannabis plant with enormous therapeutic potential for endurance athletes.



CBD 101



THE BASICS

In this chapter, we'll go over some important basic concepts — they'll be helpful as you begin your journey with CBD. Topics like what CBD oil is, where it comes from, and how it's produced will all be covered. We'll also answer some of the most frequently asked questions those new to CBD might have.

Introducing CBD Oil

CBD is headed toward mainstream acceptance. The popularity of this cannabis-derived compound is growing exponentially fast, finding its way into everything from tinctures and drops to CBD-infused edibles and balms. A wide range of cosmetic products are starting to incorporate the plant compound, too.

Athletes are taking CBD to optimize athletic performance, and initial reports are very promising. It's safe to say that the future of CBD as a natural



alternative to traditional drugs and pain killers is bright.

Before continuing, we'd like to make an important distinction.

You may hear terms like CBD, cannabinoid, cannabidiol, and even endocannabinoids being used — and we realize it can get confusing. We'll go into more detail on this in the next chapter, but it's important to note that **hemp oil** and **CBD oil** are not necessarily the same product.

Hemp oil refers to any oil extracted from any part of the hemp plant. It might refer to the oil extracted from hemp seeds, which is generally used for cooking and as a dietary supplement. This type of hemp oil does not contain any CBD or any other cannabinoids.

CBD oil, on the other hand, is made by extracting hemp's primary 'active ingredients', which include cannabinoids, terpenes, and other active compounds, from the plant's flowering tops. So if you see the terms hemp and CBD used interchangeably, this is why. CBD, or Cannabidiol, is arguably the hemp plant's most important ingredient. And hemp itself is part of the larger cannabis plant family.

Q: What is CBD Oil?

A: CBD oil is a natural, concentrated oil which is extracted from the flowers and leaves of the cannabis plant. You can think of it kind of like an essential oil; what lavender Essential Oil is to the lavender plant, CBD oil is to hemp.

CBD oil is used for a variety of therapeutic purposes by people all over the world. And this use, as we've mentioned before, is actually nothing new. The benefits of CBD oil are timeless; it contains a truly amazing variety of active compounds, including cannabinoids and terpenes (we'll discuss those later on, in Chapter 5). This unique blend means CBD gently remediates health with virtually no side effects. It's also totally non-toxic — and therefore impossible to overdose on.

Depending on the formulation of CBD oil, it may contain additional active ingredients. These include hemp seed oil, which itself contains omega fatty acids, amino acids, vitamins, minerals, and other beneficial compounds. Some products are more "full spectrum" than others; we'll get to what that means later on, too.

Q: What is Cannabis?

A: Cannabis is one of a genus of plants known as Cannabaceae. There are two main species of cannabis which are cultivated for human use: Cannabis Indica, and Cannabis Sativa.

Sativa plants are taller and produce more fiber; they're the species from which hemp cultivation began. Indica plants are shorter and bushier, and therefore less suitable for industrial farming. Indicas are perfect for the production of medical 'marijuana' because of their density and high cannabinoid content.



PCR hemp contains as much as **ten times** the concentration of CBD as generic industrial hemp, while still being virtually THC-free.

HEMP VS MARIJUANA: EXAMINING THE DIFFERENCES

Technically, both hemp and 'marijuana' are cannabis. Hemp is low-THC, high CBD cannabis, and 'marijuana' is the opposite: high in THC and low in CBD. But technically, it's all cannabis!

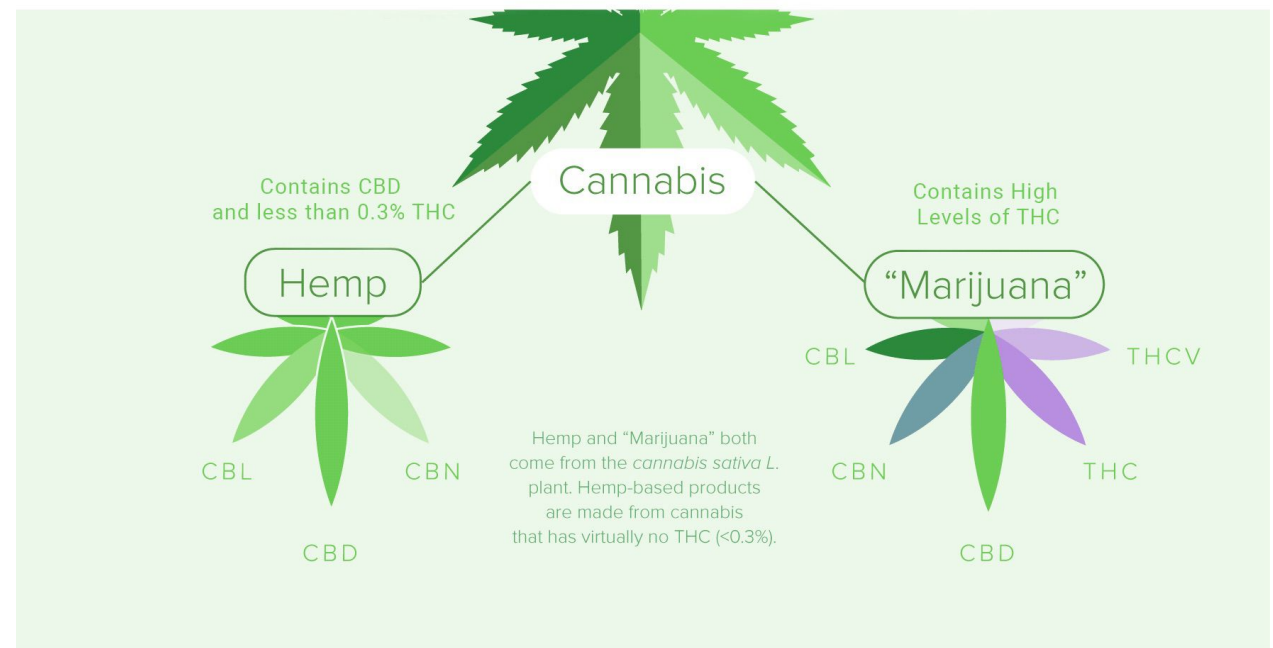
THC, or delta-9 tetrahydrocannabinol, is the psychoactive compound in some types of cannabis that causes a high. The presence of this small but powerful compound in 'marijuana' means that it's considered a drug. That classification is probably justified — 'marijuana' can be very psychoactive, after all.

At the same time, marijuana also has health benefits of its own, and may be especially good for those with severe pain or PTSD. It can be cultivated for either medicinal and "recreational" purposes. Both indica and sativa strains, as well as hybrids of the two, are used to produce marijuana.

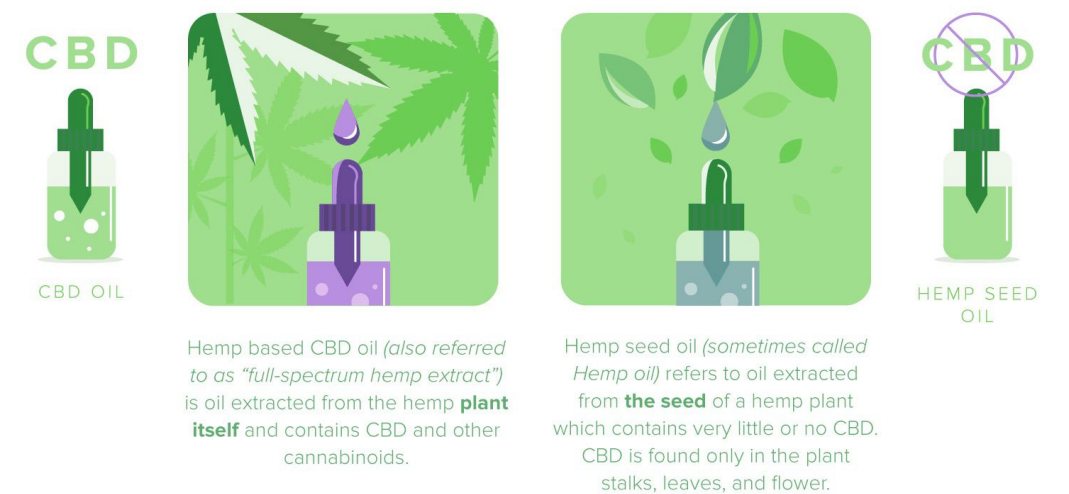
The United States federal government considers marijuana to be a Class I controlled substance. However, that hasn't stopped many US states from introducing laws to allow regulated cultivation and medicinal use. Some states have went a step further, and also legalized marijuana for recreational use.

Keep in mind that Hemp is not marijuana. Although hemp

The Difference Between Hemp & Marijuana



The Difference Between CBD and Hemp Seed Oil



does contain cannabinoids, it has negligible amounts of THC. In order to be legally cultivated, industrial hemp must contain less than 0.3% THC by dry volume — that's less than one part

in 300. Industrial hemp is grown for food, for fiber, and sometimes for CBD, though sourcing the cannabinoid from it isn't preferable.

Why? Because Industrial hemp contains relatively small concentrations of cannabinoids and terpenes. In order to extract any appreciable CBD from it, huge quantities of the plant's unprocessed biomass have to be used. With this biomass often comes the buildup of mold toxins or environmental pollutants.

While many of the CBD products on the market are produced from industrial hemp, ours is a little different. The CBD oil in Venga CBD products is made from a CBD-rich type of Cannabis sativa known as **PCR hemp**.

PCR stands for phytocannabinoid rich. PCR hemp contains as much as **ten times** the concentration of CBD as generic industrial hemp, while still being virtually THC-free. It's completely non-psychoactive, so it's doesn't cause a high, nor is it classified as a drug.

TYPES OF CBD OIL

Let's now take a look at some of the different types of CBD oil products Each type has different qualities and different strengths and weaknesses. Here you'll get a better idea of what product type might be best for you.

CBD From PCR Hemp vs. CBD From Marijuana

Essential oils can also be extracted from marijuana, the same way they can be extracted from hemp. The essential oils made from marijuana are correctly referred to as cannabis oil.

Cannabis oil is only legal in states which allow the cultivation of marijuana. While extracts made from marijuana may contain some CBD, they also contain enough THC to cause a high. It's for these reasons that cannabis oil is considered to be a controlled substance.

Of all CBD oil's possible sources, we believe CBD that's been extracted from phytocannabinoid rich hemp is by far the best. Marijuana-derived CBD oil contains too much THC, while CBD oil from industrial hemp is too poorly regulated. PCR hemp-derived CBD, on the other hand, is what Venga CBD uses, and it's also what we'll be focusing on from this point forward.

Raw CBD Oil vs. CBD Concentrate

When the hemp plant's essential ingredients are first extracted, the resulting product is considered raw hemp extract. This raw extract can then be filtered and distilled to remove unwanted compounds like waxes and chlorophyll. Depending on the level of filtration, various classes of CBD oils result, some more purified than others. These refined oils are referred to as CBD concentrate or CBD distillate.

Whole Plant/Full Spectrum CBD Oil

CBD is the primary active ingredient in CBD oil; that's not surprising, given its name. But it's not the only compound responsible for the health benefits of CBD oil. In fact, full spectrum CBD oil contains hundreds of other helpful compounds. And while these other compounds are only present in CBD oil in trace amounts, their combined synergy contributes to what's called the entourage effect (more on that later).

Full Spectrum CBD also includes small amounts of other cannabinoids, like CBG, CBN, CBDa, THC, and THCa. That's a lot of abbreviations! It isn't important that you know them all — it's just important to remember that these trace compounds have a big impact when taken together.

Earlier we mentioned another class of compounds called **terpenes**; these are the compounds that give cannabis its unique smell. Full spectrum CBD oil is full of terpenes, and they also synergize with trace cannabinoids to engage the entourage effect.

Overall, the balanced blend of cannabinoids and terpenes found in full spectrum oils is true to the original composition of hemp — and more effective than CBD on its own.

CBD Isolate

CBD can also be purified and isolated from other cannabinoids. In this form, it's known as CBD isolate. Usually it comes in a white, crystalline form, as cannabinoids are colorless solids at room temperature. And unlike full spectrum oils, CBD isolate is also devoid of terpenes and lacks much of a smell.

CBD Isolate's lack of additional terpenes and cannabinoids means it's not quite as powerful, per unit, as a full spectrum oil would be.

CBD isolate can be consumed directly or used as an additive in CBD oils, edibles, or infused products. It may be effective for those with mild health concerns, but its lack of additional terpenes and cannabinoids means it's not quite as powerful, per unit, as a full spectrum oil would be.

CBD-Rich Oil

CBD-rich oil is another common term used to describe certain

hemp extracts. It is generally used to label a CBD oil which has gone through some initial filtration and distillation steps. This oil will have most of its chlorophylls and waxes removed. The resulting product has a higher CBD concentration and purity than the raw extract it came from. It will probably be partially full spectrum.

CBD-Infused Oil

The term CBD-infused oil can be used to describe one of two things:

- A product which has been infused with purified CBD isolate, or
- A product which has been infused with a CBD-rich, full-spectrum concentrate.

Keep in mind that any properly labelled product will specify which ingredients it uses. If the ingredients include “CBD” or “CBD isolate,” then the product is not full-spectrum. If the ingredients include “CBD-rich hemp oil (or extract),” “full-spectrum CBD oil,” or “whole plant CBD,” then you can have confidence that you’re getting a full-spectrum product. This difference may seem subtle, but it’s important.

Whole Plant/Full Spectrum vs. Broad Spectrum CBD Oil

Another product which needs to be discussed is broad spectrum CBD oil. While full spectrum CBD oil retains the original concentrations of cannabinoids and terpenes found in

raw PCR hemp extract, broad spectrum CBD oil is a little different.

Broad spectrum oil is made by infusing CBD isolate and isolated terpenes into an oil base. It’s not made with natural CBD-rich extracts. Instead of using the terpene combinations native to hemp, broad-spectrum oils contain individual terpenes that have been stripped of their natural essence. Often times, these terpenes aren’t even sourced from cannabis! They may come from other, less costly plant sources, or even from synthetics

Although broad spectrum oils are less expensive to produce than their full spectrum counterpart, they’re sold at the very same price. Why? Because these broad spectrum oils are usually produced by companies more concerned about their profit margins than the quality and effectiveness of their products.

If you’re going to spend money on CBD oil, get the real thing — just as nature intended.

A LIST OF CBD OIL EXTRACTS

To summarize, there are a variety of CBD extracts, and not all are created equal. Each type of extract contains varying levels of CBD, other cannabinoids, and terpenes.

Hemp oil – oil produced from any part of the hemp plant; may not contain CBD.

Raw industrial hemp extract – a low quality source of CBD oil.

Raw PCR hemp extract – a high quality, full spectrum source of CBD oil.

CBD concentrate – a full spectrum oil with unwanted compounds filtered out.

CBD isolate – purified CBD isolated from other beneficial terpenes and cannabinoids.

CBD-rich oil – full-spectrum CBD oil that's been partially filtered.

CBD-infused oil – a product infused with either pure CBD or a full-spectrum product.

Broad spectrum oil – an oil which contains CBD isolate and isolated terpenes.



FREQUENTLY ASKED QUESTIONS

As you can see, CBD oil can be a complicated product. The CBD industry as a whole can be complicated and unregulated, too — similar in some ways to the Wild West. There are few clear regulations as to what CBD oils may contain, or what their manufacturers can claim. And because of the way the industry has grown, a great deal of misinformation surrounds CBD oil and what it actually does. This, of course, has caused a great deal of confusion.

One of the main points of confusion comes from the media, who often uses the term marijuana to refer to hemp (and vice versa). Left to news reports, one might understandably wonder: is CBD oil legal? Will it make me high? What about drug tests?

Our aim is to clear up this confusion, so we'll answer all these questions, and a few more.

Is CBD Oil Legal?

Yes. Though this is perhaps the most contentious issue of all, 2018's Federal Farm Bill made CBD's legality totally clear.

Hemp extracts, which include CBD oil, are considered to be a food product. They're just as legal as peppermint oil or vanilla. It's true that cannabis oil is not legal outside of states which have specifically legalized marijuana, and it cannot be sold or transported across state lines. But this is definitely not the case with hemp-derived CBD oil.

Does CBD Oil Get You High?

No. Properly produced CBD oil from hemp does not contain THC in nearly high enough concentrations to cause a high.

THC acts on the brain's CB1 receptors, directly changing brain chemistry and thus altering consciousness. CBD, on the other hand, does not trigger these receptors. In fact, it may gently reduce psychoactivity by balancing out the effects of THC.

While CBD oils produced by some manufacturers may contain trace amounts of THC, Venga CBD products are made using chromatography technology which completely removes THC while leaving other cannabinoids and terpenes intact. That means our products are completely non-psychoactive and **safe for drug testing** — engineered for competitive endurance athletes.

Does CBD Show Up On Drug Tests?

Considering that CBD is derived from cannabis, that's a fair question. Thankfully, CBD oil will not show up on a drug test, especially not if it's THC-free like ours is.

Why not? Because drug tests don't test for CBD, only for THC.

However, there are some issues to be aware of. CBD sourced from marijuana usually contains enough THC to make you fail a drug test. And even CBD oil sourced from hemp can contain

THC in some instances. A high dose of this type of CBD oil may produce what's known as a false positive.

The legal limit for THC levels in industrial hemp is 0.3%. That means an oil containing 200 mg of CBD might also contain several mg's of THC. So, if you're taking extremely large doses of full spectrum CBD oil, it's important to be mindful about false positives.

If a false positive does occur on one's initial urinary screening, it's usually followed by a more advanced second screening. This in-depth analysis, which is more accurate, can then rule THC use out.

For these reasons, it's important to notify your employer or coach if you choose to take CBD oil. Of course, we'd also encourage you to steer away from marijuana-derived CBD. To be even safer, consider a THC-free product that's been verified through lab testing, like those available from Venga CBD.

What Are the Side Effects of CBD Oil?

CBD oil has virtually no side effects, especially if it's whole plant or full spectrum. This often comes as a surprise to new users, who may have grown accustomed to powerful pharmaceuticals that seem to always do something unwanted.

But mother nature is different, and favors gentle restoration over the sometimes-too-specialized action of prescription drugs. By activating natural pathways within the

endocannabinoid system, CBD is able to guide the body towards healing without causing any imbalances or side effects.

CBD oil has virtually no side effects, especially if it's whole plant or full spectrum.

CBD is also unique in that it works differently for different people. For example, some people take CBD oil in order to lose weight and help regulate metabolism. These users attest that CBD helps their weight-loss efforts.

At the same time, others claim that CBD actually increases their appetite! Usually this comes from those who don't want, or need, to lose weight. These individual variances happen often with CBD, and they have something in common with the lack of side effects we mentioned earlier: both qualities work via the endocannabinoid system (ECS). That's because the ECS is amazingly dynamic, working to **restore in each person the inner balance that's best for them.**

Will CBD Make Me Drowsy?

The short answer is, probably not. The longer answer is, it depends: CBD has biphasic properties, meaning its effects vary depending on the dosage taken. Small amounts of CBD are unlikely to cause drowsiness. Larger doses, however,

sometimes do make users a little sleepy. We'll discuss CBD's biphasic properties more in Chapter five.

Another plus: taken at a moderate dose, CBD may promote sleep when it's most useful — at night. Unlike conventional sleep aids, which tend to make one uncontrollably sleepy, CBD helps the body's circadian rhythm stay in sync with sunlight cycles. That means more wakefulness during the day and better sleep at night.

KEY TAKEAWAYS

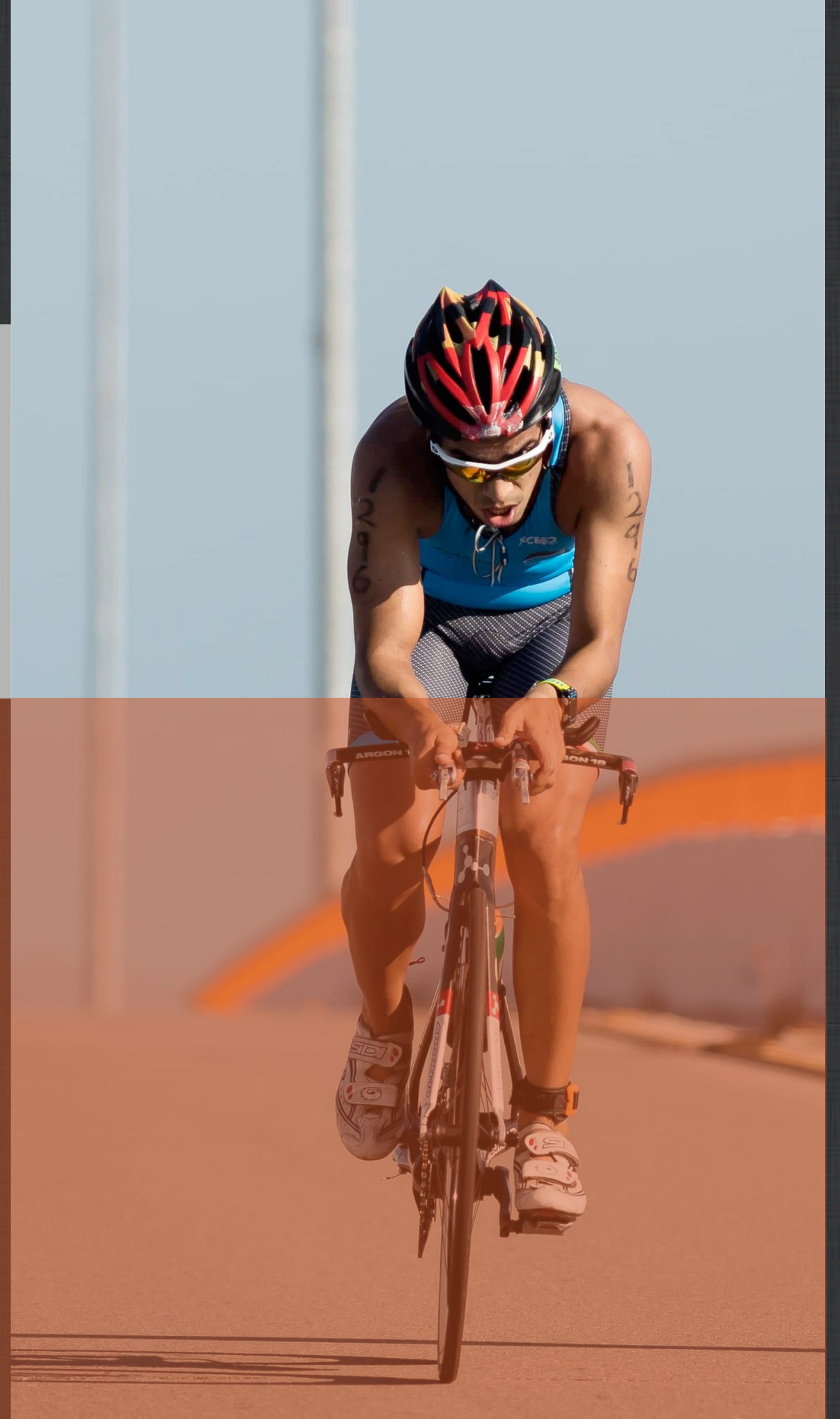
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2. Technically, both hemp and 'marijuana' are cannabis. Hemp is low-THC, high CBD. Cannabis, and 'marijuana' is the opposite: high in THC and low in CBD.
3. CBD is Legal - 2018's Federal Farm Bill made CBD's legality totally clear.
4. CBD cannot get you high. Venga CBD products are made using chromatography technology which completely removes THC while leaving other cannabinoids and terpenes intact.



CHAPTER 2

CBD & YOUR BODY

CBD is the primary 'active ingredient' in hemp. It's one out of hundreds of similar compounds, called cannabinoids, that are produced by the cannabis plant family. CBD is simultaneously one of the most powerful and least psychoactive cannabinoids.



CBD & YOUR BODY

How CBD Interacts with the Body

CBD is the primary active ingredient in hemp. Its one out of hundreds of similar compounds, called cannabinoids, that are produced by the cannabis plant family. CBD is simultaneously one of the most powerful and least psychoactive cannabinoids. CBD is short for cannabidiol, though its not an acronym. Cannabidiol has been shortened to CBD because its customary for cannabinoids to be represented by three letter abbreviations, like THC for tetrahydrocannabinol or CBG for cannabigerol. THC is probably the most famous member of the cannabinoid family. Its the one that causes a high, after all. We'll take a look at other common cannabinoids later on.

What Are Cannabinoids? Cannabinoids are active compounds produced by all cannabis plants and by all



living humans. Technically, there are two types of cannabinoids:

Endocannabinoids: Cannabinoids produced internally, by the human body.

Phytocannabinoids: Cannabinoids produced by plants.

PCR hemp, for example, contains many phytocannabinoids. In addition to cannabidiol (CBD), there are cannabichromene (CBC), cannabigerol (CBG) and Cannabidivarin (CBDv). Like CBD, CBC is non-psychoactive.

What Do Endocannabinoids Do?

Endocannabinoids are cannabinoids produced by us, for us. They serve as signaling molecules, or neurotransmitters, that help the body communicate within itself.

Many neurotransmitters are produced by the nervous system

in response to things like health levels and environmental factors. They interact with and send messages to receptors found on the surfaces of cells. Their primary job is to help cells adjust their activities.

In order to illustrate how neurotransmitters work, let's use an analogy. The brain doesn't connect with every cell in your body, just like traffic officers don't connect directly with every car on the road.

Your body's endocannabinoid system (ECS) connects to a wide variety of sensors to keep track of every system in your body.

In both cases, that means some messages have to be relayed. In the case of managing traffic, we implement traffic signals. These signals inform drivers where they can and cannot travel, when they should stop and when they should go, how fast they are allowed to move, and so on.

Some of these signals can sense what's going on in the environment — such as when a car pulls up to a traffic light. The sensor triggers a controller causing the light to change, thereby changing the behavior of drivers approaching that intersection.

In the same way, your body's endocannabinoid system (ECS) connects to a wide variety of sensors to keep track of every system in your body. The signals from these sensors are decoded by the brain and the nervous system. If it's determined that a system has gone out of balance, the ECS releases neurotransmitters into areas that need the most help.

THE HUMAN ENDOCANNABINOID SYSTEM

Now that we understand how neurotransmitters work to adjust our cellular activity, let's take a look at the role endocannabinoids play in maintaining homeostasis, or balance, within the body.

The human endocannabinoid system (ECS) has two components: endocannabinoids, and endocannabinoid receptors which pick up their signals.

In a sense, the endocannabinoid system actually motivates us to exercise.

Endocannabinoids are unique in that they're produced directly from the fat-based cell membranes of nerve and brain cells. This resourcefulness means endocannabinoids can be produced quickly — basically on demand — wherever the body needs them. In other words, endocannabinoids are as natural as you can get.

CBD helps the ECS produce greater amounts of endocannabinoids in the areas where they're needed. One of these endocannabinoids, called anandamide, is responsible for the production and uptake of serotonin. Serotonin is a neurotransmitter responsible for mood and anxiety

Often referred to as the “bliss molecule”, anandamide's impact on serotonin levels directly improves one's mental state. While serotonin levels are often low in people suffering from depression, those with a healthy ECS usually produce plenty of serotonin.

This biochemical 'cross-talk' means that exercise is excellent for the endocannabinoid system health. Exercise, especially prolonged exercise, delivers an influx of new endocannabinoids into the brain, causing a better stress response and a more dynamic metabolism.

In fact, recent evidence shows that endocannabinoids (eCB's) are to thank for “runner's high,” that post-workout euphoria we've grown to know and love. Once thought to be caused by endorphins, it turns out that endorphin molecules are much too large to actively enter the brain. eCB's, on the other hand,

are small and easily activate the brain's 'feel-good' receptors. In a sense, the endocannabinoid system actually motivates us to exercise.

But does this mechanism flow both ways? If exercise is good for endogenous cannabinoids... are plant cannabinoids like CBD good for exercise?

The answer is **definitely yes**. CBD fosters several improvements in athletic performance — Please see chapter 3 for athletic performance details.

In general, the endocannabinoid system is vast and far-reaching. It regulates a wide array of bodily functions, from appetite regulation to sleep patterns, moods, metabolism, immune response, the lifespan of cells, and much more. This is the reason that CBD seems to effect such a wide range of conditions.

A list of common cannabinoids

Below is a list of the most common cannabinoid molecules found in cannabis and some of the effects they are believed to possess.

CBD (Cannabidiol) – The second most common cannabinoid produced by the cannabis plant, CBD is non-psychoactive, meaning it doesn't get you high.

THC (Delta(9)-tetrahydrocannabinol) – The primary psychoactive compound in marijuana that gives users a feeling of euphoria.

CBC (Cannabichromene) – The third most common cannabinoid, also non-psychoactive, is thought to have anti-inflammatory, anti-depressant, and antifungal effects.

CBN (Cannabinol) – Believed to act as an appetite stimulant, antibiotic, anti-asthmatic, pain reliever, and sedative, CBD has shown to be great for sleep.

CBG (Cannabigerol) – Non-psychoactive, used as an antibiotic, antidepressant, and pain reliever.

THCv (Tetrahydrocannabivarin) – Less psychoactive than THC, known to have neuroprotective properties.

CBDv (Cannabidivarin) – Similar to CBD in its effects.

Delta(8) THC – Similar to delta(9)-THC, less psychoactive, may have neuroprotective and anti-anxiety properties.

THCa and CBDa – Compounds found in raw cannabis, both THCa and CBDa are non-psychoactive and have anti-inflammatory, anti-parasitical, and antioxidant properties.

Additional Functions of Cannabinoids

Although cannabinoids are mainly known for their intricate regulation of the endocannabinoid system, they also function in other ways.

For example, cannabinoids have been revealed as potent antioxidants. The US government even owns a research patent on this topic! While vitamin C is a better known antioxidant, CBD has been shown to be many times more potent.

This is important because the process of producing energy from food isn't an entirely clean one. Energy production, especially the accelerated type that occurs during exercise, generates molecules known as free radicals. And while a small amount of free radicals is useful for cellular signalling, their buildup can quickly become harmful.

Left unchecked, free radicals latch onto molecules in our cells to cause oxidation, similar to how air causes metals to rust. Free radicals can damage DNA or even destroy cells. Over time, their activity causes disease and aging. Antioxidant

molecules including endo and phytocannabinoids alike, actively 'scavenge' for free radicals and render them harmless.

What Are Terpenes?

Terpenes are a class of volatile compounds called hydrocarbons that are produced by the cannabis plant as well as most other plants. Terpenes readily evaporate at room temperature, and our noses are highly sensitive to them.

Terpenes are fully natural and recognized as safe for human consumption by the Food and Drug Association, They're used in a wide variety of food and cosmetic products. If you've ever taken essential oils before, you've used them, too (many essential oils are 90% terpenes by weight).

In nature, terpenes act as both repellents for pests as well as attractants for pollinators and seed spreaders. In cannabis, terpenes are produced in highest concentrations in the plant's female flowers.

Although terpene molecules are similar to each other, each has its own unique scent and flavor. Various combinations of terpenes are responsible for the distinct aromas of cannabis strains. In fact, the hemp plant is very unique in that it contains a wide array of terpenes normally only found individually in other plants.

Terpenes can also have powerful effects on our bodies. In

fact, terpenes have been utilized by humans for millennia in a healing modality known as aromatherapy. For example, the scent of citrus is produced primarily by a combination of limonene and pinene, both of which are thought to elevate mood.

Terpenes have been utilized by humans for millennia in a healing modality known as aromatherapy.

Below are some of the most common terpenes in hemp, along with their reported benefits:

Linalool has a floral scent and is the main terpenes found in lavender. It is used as a sleep aid as well as a pain reliever, and an anti-inflammatory. It has also been used in the treatment of psychosis and anxiety.

Terpinolene is produced by oregano, marjoram, cumin, lilac, citrus, and conifers. It has been used to help insomnia for hundreds of years. It's believed to be an anti-biological agent with antibacterial and antifungal properties.

Myrcene is found in plants such as mango, hops, bay leaves, eucalyptus, and lemongrass, among others. It is thought to be

useful in the treatment of spasms, insomnia and pain. It's believed to have anti-inflammatory effects, too. Myrcene is also responsible for some of the relaxing effects of hemp and cannabis.

Citronellol is produced in geraniums, rose, and citrus. You might recognize its odor from its use as a mosquito and moth repellent. It's thought to have anti-biological, anti-inflammatory and immune-regulating effects.

Caryophyllene is found in basil, cloves and black pepper. It is believed to have anti-inflammatory, anti-biological, and antioxidant properties.

Pinene is found in pine trees and orange peels. It is thought to have anti-inflammatory effects and has been used for centuries in the treatment of asthma.

Limonene has a strong citrus odor and bitter taste. It is commonly used for treating toenail fungus, gastric reflux, depression and anxiety. It's also believed to have immune-boosting properties.

Humulene is found in hops and has an odor reminiscent of beer. It has been used for centuries for anti-bacterial, anti-inflammatory and appetite suppressant effects.

Camphene has an earthy, woody aroma. It is a component of camphor oil and ginger oil, which are both thought to provide therapeutic effects.

Terpineol is found in lilacs and other flower blossoms and has a sweet scent. It is thought to produce calming, relaxing effects. It also exhibits antibiotic and antioxidant properties.

Phellandrene is produced in a number of herbs and spices. It is responsible for the aroma of peppermint. It is often used in traditional Chinese medicine to treat digestive disorders and treat systemic fungal infections.

*When you take a full spectrum CBD oil,
you get more than just CBD — you
basically get aromatherapy, too!*

Some terpenes can act as neurotransmitters. They can also act as serotonin uptake inhibitors, enhance norepinephrine activity, and increase dopamine activity. All of these actions are known to produce antidepressant effects.

More importantly, some terpenes (especially beta-caryophyllene) even act on cannabinoid receptors and

enhance the effects of cannabinoids.

The Entourage Effect

Although not quite as potent as cannabinoids like CBD are, terpenes are valuable medicinal components of cannabis.

The overall impact of hemp's combined cannabinoid and terpene content is known as the entourage effect. In the case of cannabis, these cannabinoids and terpenes work together to produce a range of effects which is greater than the sum of its parts. Recent studies show that full spectrum extracts which include terpenes are up to four times stronger, per unit, than CBD isolates which do not.

More research is needed to determine the exact role that terpenes play in the overall effects of CBD oil, but it's clear that terpenes work in concert with cannabinoids to produce a richer effect than CBD alone.

As we mentioned earlier, some CBD oils are actually just a carrier oil infused with pure CBD. These products miss out on the entourage effect because they don't have the added benefits of hemp's other terpenes and trace cannabinoids.

Thankfully, there are better options out there. Venga CBD products use only full-spectrum CBD oil with a rich mix of cannabinoids and terpenes — minus any THC. Our products are engineered for endurance athletes in every way; they're helpful during training and permitted during competition.

Venga CBD products are engineered for endurance athletes in every way; they're helpful during training and permitted during competition.

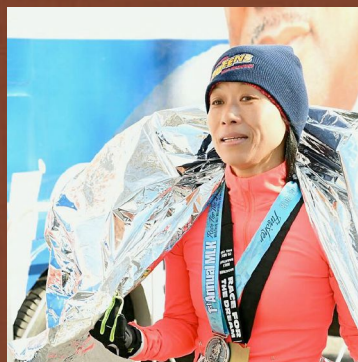
KEY TAKEAWAYS

1. Cannabinoids are active compounds produced by all cannabis plants — and by all living humans.
2. Endocannabinoids are cannabinoids produced by us, for us. They serve as signaling molecules, or neurotransmitters, that help the body communicate within itself.
3. The endocannabinoid system regulates a wide array of bodily functions, from appetite regulation to sleep patterns, moods, metabolism, immune response, the lifespan of cells, and much more.

CHAPTER 3

CBD FOR ENDURANCE ATHLETES

CBD has wide ranging and profoundly positive effects on the body and it's performance. This makes CBD a must-have for the endurance athlete to help manage inflammation, pain, recovery and the inevitable injuries.



HOW CBD HELPS ENDURANCE ATHLETES

Pain during endurance training & racing is a given but there's often a different kind of pain and discomfort that shows up to tell you to slow down or even STOP.

It appears in the form of inflammation.

Inflammation is the #1 source of pain — and it uses pain, stiffness and immobility to send the message it wants you to do things differently.

Inflammation is the result of your body's immune system kicking into high gear to respond to an injury or infection. As a result, the damaged cells release chemicals (including histamine, bradykinin, and prostaglandins) that cause blood vessels to leak fluid into the tissues, causing swelling. And while the



inflammation does help isolate the tissue and thereby quarantine the problem, it also causes pain.

The common “go-to” for helping alleviate the pain with most endurance athletes is often an over-the-counter (OTC) drug touting anti-inflammatory effects. Otherwise known as NSAIDs (non-steroidal anti-inflammatory drugs), over 17 million Americans take these drugs on a daily basis. And among endurance athletes who put their bodies through the ringer on a regular basis, the percentage of those regularly taking OTC drugs is extremely high.

With endurance athletes, regular use of NSAIDs can lead to even greater compounded problems. For example, acute kidney injury (AKI) is a common issue encountered in over 34% of ultramarathoners. NSAIDs are thought to contribute to AKI and yet between 35%-75% of ultramarathoners ingest them during competition. Research found that many of these

competitors (about 44%) had creatinine levels high enough to indicate the onset of AKI after running 50 miles. But the incidence was particularly high among runners who had taken ibuprofen. They were found to be about 18% more likely to have developed acute kidney injury than racers who did not take any NSAIDs.

Twenty years of research and countless studies have proven the anti-inflammatory benefits of phytocannabinoids and terpenoids, both of which are included in today's full-spectrum CBD supplements. Better yet, these plant-based cannabinoids utilize different mechanisms in an athlete's body to produce the desired anti-inflammatory results we need to keep up with our training and recovery, without the negative side effects that come from using NSAIDs.

CBD works with your body's innate Endocannabinoid System to release neurotransmitter molecules that suppress the inflammation mechanisms and thereby reduce pain and allow the tissues to heal faster. CBD has shown significant COX-2 enzyme blockage, which is the key to naturally reducing inflammation in one's body.

CBD helps you recover from workouts more quickly, recover from injury more effectively and alleviate pain during competition or endurance training.

THE ENDURANCE OCTAGON

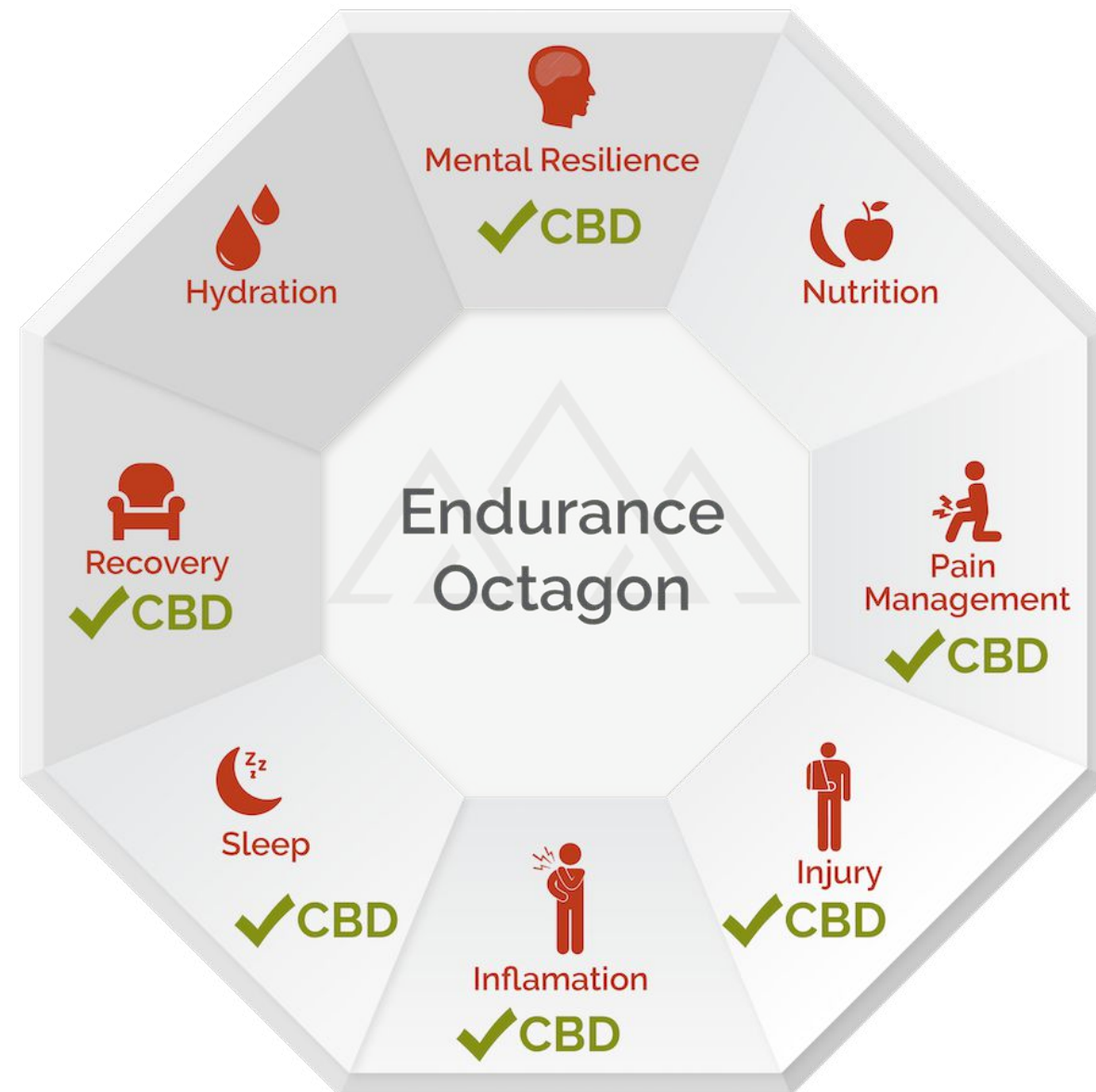
Training day, after day, after day, a key aspect of endurance life, requires your body to be resilient. To maintain a resilient body there are 8 areas of endurance life you must manage, nurture and prioritize.

We call it the endurance octagon.

As you well know, effectively managing these areas is critical to being a successful endurance athlete. When any one area gets too out of balance it has a negative effect on all the rest. So while we may manage them separately, they are all interrelated. To illustrate this we created the graphic on the next page.

It also shows that CBD can play a significant role in helping keep at least 6 areas in balance and to help target pain. The 6 areas are:

- Mental Stress and Anxiety
- Inflammation
- Injuries
- Sleep
- Training Recovery
- Pain Management



Reduces Stress & Anxiety

CBD has been shown to reduce anxiety and modulate the same systems in the brain as prescription anti-anxiety medications.

Alleviates Pain

CBD has been shown to effectively relieve pain in both muscles and joints by reducing inflammation and working with your body's endocannabinoid system.

Fights Inflammation

CBD is known to be one of nature's best anti-inflammatory remedies.

Enhances Sleep

CBD works to maintain homeostasis in one's body, which helps regulate your ability to naturally unwind and fall asleep.

Speeds Recovery

CBD plays an enormous role in regulating & stabilizing the immune system which enhances your body's ability to quickly and efficiently recover from physical exertion.

Aids Injury Recovery

Approved by W.A.D.A. as safe to use, athletes around the globe are now using CBD to treat injuries.

HOW CBD HELPS THE ATHLETE'S BODY

CBD is an Adaptogen

One of the main purposes of endurance training is to stress your body such that it adapts to a higher level of performance. An adaptogen is defined as something that helps the body adapt to stress. Though CBD isn't yet officially classified as an adaptogen, several studies are on going to determine how CBD acts as an adaptogen in the body. That means it helps the body adapt to exercise, which is a form of stress — good stress — in and of itself.

The most effective workout plan carefully balances training stress and active recovery; in its role as an adaptogenic compound, CBD makes it easier to walk this fine line.

CBD Reduces Stress

Taking things a step further, CBD reduces existing stress. It may even reduce the risk of overtraining syndrome and the central nervous system exhaustion that accompanies it.

Conversely, CBD also allows for a greater stress tolerance. That means you can train harder and bounce back faster without getting burned out. All in all, the benefits are pretty impressive. Keep reading to learn more about how they happen behind the scenes.

CBD Improves Fat Metabolism

As an endurance athlete, your training probably already promotes increased fat oxidation and better glycogen storage. You may even train fasted to really boost things. CBD simply accentuates this, which means improved endurance and a stabler mood both on and off the trail. And if you can stay in fat burning mode during low and moderate intensity exercise, you'll have much more fast-burning fuel left for the really intense stuff. The CBD molecule itself seems to be engineered for endurance.

Though the mechanisms used here are complex, one way CBD may promote fat oxidation is through the activation of brown adipose tissue, or 'brown fat', which is more metabolically active than regular fat stores. Another plus? Higher brown fat levels are good for weight loss.

CBD Reduces Inflammation & Free Radicals

CBD's ability to reduce inflammatory markers is clearly good for exercise recovery. By boosting the endocannabinoid system, CBD helps immune cells work efficiently to target the right areas. This means lower overall inflammation and better immunity exactly where it counts.

In addition, CBD is so effective for keeping free radicals in check that the US government has a patent on the subject. Remember that free radicals aren't entirely bad; in appropriate

amounts, they act as helpful signals of stress and friction. CBD helps keep free radical levels in the right range, keeping your training response stays strong.

CBD Improves Mitochondrial Health

This means good things for your endurance. You may have heard that mitochondria are the powerhouse of the cell, but did you know that every mitochondrion contains endocannabinoid receptors?

As it turns out, they do! That's why CBD is able to improve mitochondrial health, which in turn has beneficial downstream effects on fat burning and other qualities we've already mentioned. CBD may even improve mitochondrial density, which is a great marker of athletic endurance.

CBD Improves Insulin Sensitivity

People with diabetes were among the first to notice that CBD can reduce blood sugar — some actually see such improvement that they're able to get off exogenous insulin!

But CBD's ability to regulate blood sugar isn't just good for those with diabetes. This same quality is great for athletes. After all, blood sugar regulation stems from improvements in the body's response to insulin, also called insulin sensitivity. With improved insulin sensitivity comes the chance for gradual improvements in body composition. That's because insulin sensitive muscles are more efficient at both intra-workout fat burning and post-workout growth.

CBD is a Neuroprotectant which may help Protect Against Sports Injuries.

While brain health is obviously important to those in contact sports, endurance athletes can stand to benefit, too. CBD's neuroprotective qualities may guard against concussions and other head trauma. And if a concussion were to occur, CBD also promotes neuroplasticity, fostering the growth of healthy new neural pathways.

Endurance athletes who are at risk for concussions, like competitive cyclists, may even want to consider taking CBD pre-race as a preventative measure. If nothing else, the CBD will likely increase fat oxidation and improve your endurance a little!

CBD Reduces Pain

This effect is one of CBD's most powerful, and also one of the main reasons our customers take the plant compound! CBD's especially promising to athletes, as it reduces inflammation and pain without dampening the training response like aspirin or NSAIDS would. That makes it good for both sports injuries and the more generalized trauma of intense workouts. Athletes who routinely take CBD are reporting less injuries, less joint pain, and less muscle soreness in general.

Overall, CBD presents a promising chance to boost your athletic performance. Of the many factors that impact endurance, CBD improves many of them: it speeds recovery and improves mental resilience; it effectively reduces pain,

inflammation and the risk of injury, and it even promotes good sleep. And while it may not directly improve hydration or nutrition, its effects on fat oxidation and leptin levels may make it easier to eat better!

We hope that you'll take a good look at Venga CBD and consider us as your preferred source for high-quality CBD oil products. We use only CBD-rich PCR hemp to produce our CBD oil. We use only full-spectrum oils in our products extracted using either supercritical CO2 or food grade ethanol. Our capsules, and topicals are made using patented nanoemulsion technology which gives our products a higher bioavailability than that of standard products. We use another patented process to remove all residual THC from our products providing a 100% THC-free product.

And we add only the highest quality ingredients to our products. Every single one of them undergoes rigorous testing to ensure they're free from any kind of contamination and have accurate CBD levels. All this in hopes of crafting the perfect CBD product for the endurance athlete — for you.

KEY TAKEAWAYS

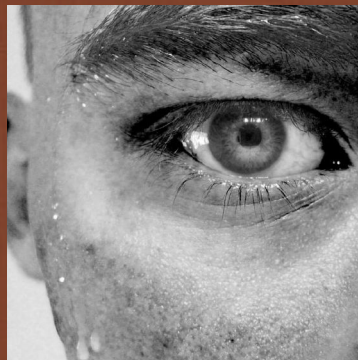
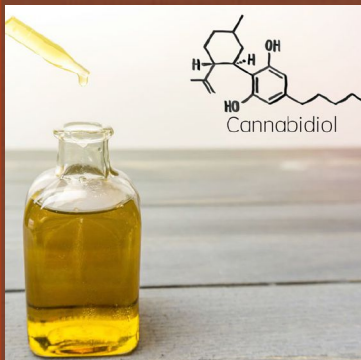
1. CBD helps the body adapt to stress which means faster recovery.
2. CBD improves fat metabolism which means improved endurance.
3. CBD is a “neuroprotectant” which means it may help protect against sports injuries.
4. CBD reduces inflammation and pain without dampening the training response like aspirin or NSAIDS do.



CHAPTER 4

GETTING STARTED WITH CBD

CBD oil is not a product whose quality should be skimmed on. You need a trusted manufacturer that makes CBD oil products that are rich in natural CBD and terpenes.





HOW TO BUY POTENT, HIGH-QUALITY CBD

The CBD market is currently expanding at breakneck pace. Unfortunately, along with the good companies, bad ones trying to capitalize on the trend. Many of them will do anything to cut corners and increase profit margins. Some companies will use inferior and unsafe product. And some are completely dishonest, selling so-called CBD oil products that have negligible amounts of CBD in them, or even none whatsoever. Or, even worse, they could contain dangerous synthetic CBD.

CBD oil is not a product whose quality should be skimmed on. You need a trusted manufacturer that makes CBD oil products that are rich in natural CBD and terpenes. After all, a recent survey by the Brightfield Group of CBD products found that a full 40% of CBD products on the market do not contain the amount of CBD listed on the label.



With all these CBD oil producers flooding the market with new products, it becomes difficult to know who to trust and where to find the highest quality CBD oil.

Identifying a Good Company

There are a few factors that need to be considered when searching for a company that makes high-quality CBD oil products. These include the source and variety of hemp, the method of extraction used to produce the raw hemp extract, whether or not the company uses nanoemulsion technology, and the quality of the other ingredients in the products they offer such as other essential oils.

The good news is that a reputable company will gladly provide this information. If it's not touted on their website, you can use their contact form to inquire about their hemp source, extraction method, and the source of other ingredients. If a company will not provide you with this information, simply

rule them out. There are plenty of respectable, high-quality CBD oil makers out there.

Preferred Hemp Sources

Hemp is farmed all over the world. The US is only recently starting to rebuild its hemp industry after a century of prohibition. However, the U.S. produces some of the finest quality cannabis and hemp products in the world.

It's important to understand that not all hemp is created equal. **Industrial hemp** is primarily grown for its seeds and fibers and is not bred to produce high levels of cannabinoids and terpenes. **PCR hemp**, on the other hand, was specifically cultivated to be rich in cannabinoids and terpenes.

In order for a CBD product which is made from industrial hemp to contain the same concentrations of cannabinoids and terpenes as CBD oil made from PCR hemp, industrial hemp CBD must be further refined removing or destroying many of the naturally occurring beneficial compounds.

If a manufacturer specifies that their CBD was extracted from industrial hemp, it's safe to assume that the product is either lower in CBD and terpenes than a product made with PCR hemp, or has been further processed and has lost some of its natural essence. Finding a company whose products are made with PCR hemp (such as those produced by Venga CBD) is highly desirable.

Chinese CBD products may contain toxic pesticides which are illegal in the U.S., or may be contaminated with molds and other biological toxins.

The lowest quality CBD oil products are usually produced in Asian countries such as China where quality standards are far lower. CBD oil products produced in China are often made from strains of industrial hemp which are not rich in cannabinoids and terpenes. And they are often extracted using cheaper methods which are harsh and can actually destroy cannabinoids and terpenes. They may contain toxic pesticides which are illegal in the U.S., or may be contaminated with molds and other biological toxins.

Quality of Other Ingredients

Although raw and refined pure hemp extract is available, the vast majority of CBD oil products contain additional ingredients such as vegetable oils, or other essential oils.

All the rules mentioned above apply here. Products produced in the U.S. are preferred. Products produced in Western Europe may also be of high quality. And product made elsewhere are quite often of lower quality.

Which ingredients are used can also be telling when determining if a company is trying to cut corners. Oils such as hemp seed oil, coconut oil, almond oil, and others are generally healthy and of high quality. If a product contains ingredients you can't pronounce or sound like chemicals, then the manufacturer is probably trying to cut corners.

For example, a product known as polyethylene glycol is often used in CBD vape oils. This is the same stuff found in your car's radiator. Although it has been approved for consumption by the FDA, there is evidence that it may irritate the lungs.

One exception to the can't-pronounce-chemical rule is an oil known as MCT oil. MCT stands for medium chain triglycerides. MCT oil is a natural product made from coconut oil. Coconut oil contains both medium- and long-chain triglycerides. Triglycerides, although this sounds like a type of chemical, are simply the main constituent of human body fat. Without going into a biology lesson, let it suffice to say that MCT's are easier for the body to process than raw coconut oil.

There are other exceptions to the rule. When in doubt just do an internet search on the ingredients in question and you'll usually be able to determine fairly quickly whether or not a particular ingredient is safe and healthy.

Quality Testing

Another important factor to consider is third-party lab testing. Most serious manufacturers will send their products out to testing labs to determine whether or not they contain any contaminants and also to measure the levels of cannabinoids in the product. If a manufacturer is not revealing their lab test results, there's probably a reason why — probably not a good one.

Because different strains and crops produce different levels of CBD, CBD oil can vary in potency from one batch to another. Any good manufacturers will want to know exactly how much CBD is in their products.

Another thing that's extremely important to know is that the product contains zero THC or have THC levels that are so negligible, there might as well be none. Because THC is highly regulated, selling hemp-derived CBD oil which contains THC can mean the end of the line for a CBD company.

Many top manufacturers will provide the lab reports for the exact batch of products being sold. If one of the makers you are considering does offer this information, give them extra points.

Venga CBD products are produced using a technology which completely eliminates THC while retaining the full spectrum of CBD, other cannabinoids, and terpenes.

CBD Oil Health Claims

This is worth touching on. Many companies will put CBD products on the market and make health claims about their product. Because health claims are not allowed by the FDA until a product is thoroughly tested and approved, these claims are a sure sign that a company does not know what it's doing. Avoid any company that uses terms like treat, cure, or heal to describe their CBD.

Finding a Trusted Manufacturer

Another way to narrow down your list of CBD oil makers is simply to do some internet research on CBD companies themselves. You'll notice that some brand names will consistently be portrayed in a good light, while others might have an overabundance of bad reviews.

There are some smaller, more obscure companies which produce very high-quality CBD but may not have much in the way of reviews. Don't necessarily rule them out. Use the methods above to determine if they will make the cut.

As we mentioned above, products produced in areas of the world other than the U.S. or Western Europe are usually of lower quality. There are plenty of great U.S. CBD oil producers to choose from, so it's best to stick with U.S.-made products.

A Word On the Dangers of Synthetic Cannabinoids

You may have heard on the news about some people in Utah becoming seriously ill as a result of using CBD products

which contained synthetic CBD — which is produced in a lab instead of in a hemp plant. We can't stress enough how dangerous these products are. Stay away from them at all costs. If you use the methods above to find a quality CBD oil maker, you should be fine.

Set Goals

It's important to have some goals before you begin using CBD oil. For example, you may not be getting enough sleep, or you may be experiencing pain after working out. Instead of using NSAIDs, consider a more holistic option! CBD ability to reduce pain without reducing the training response is very promising for athletes. Determine what effects you're hoping to get from CBD oil so that you can make a decision as to whether or not it's working for you.

Determine Your Dosage

If you're taking CBD oil for health maintenance you should be taking lower doses of CBD. Anything over 50 milligrams a day may be more than you need. You may only need 25 milligrams or less per day.

If you're trying to target a particular ailment, on the other hand, you might need higher doses of CBD. Or you may be taking medications with which CBD will interact. And there may be other considerations. You really need to discuss your decision with a qualified medical professional who is well-versed in the use of CBD as a therapy for your particular condition in order to determine your ideal dosage.

Choose a Good Company and Stick With Them

Finding the right product for you from a high-quality maker is paramount. Once you choose a trusted brand and a particular product, stick with it for a while so that you can truly gauge its effectiveness.



Because different strains and crops produce different levels of CBD, CBD oil can vary in potency from one batch to another.

KEY TAKEAWAYS

1. **PCR hemp** was specifically cultivated to be rich in cannabinoids and terpenes.
2. Determine what effects you're hoping to get from CBD oil so that you can make a decision as to whether or not it's working for you.
3. CBD oil is not a product whose quality should be skimmed on. You need a trusted manufacturer that makes CBD oil products that are rich in natural CBD and terpenes.



CHAPTER 5

HOW TO TAKE CBD

In this chapter, we'll take a look at some of the methods by which you can take CBD. We'll discuss some of the factors involved in determining dosage. We'll also look at the strengths and drawbacks of each method and discuss which methods are most often recommended for particular conditions.



BIOAVAILABILITY OF CBD

What Matters is How Much Gets into Your Bloodstream

It's important to understand that CBD is an oil and our bodies are 60%+ water. Because oil and water don't mix, it's hard to get CBD into the blood stream where it can have an effect. In this chapter we'll look at various ways we can take CBD and the trade-offs with each.

Not all methods of administering CBD are created equal. Their efficiency depends not only on a product's ingredients, but also on the bioavailability of each method. Bioavailability just refers to the percentage of a compound that enters the bloodstream intact. Once there the compound, in this case CBD, can begin to remediate health.

When it comes to CBD oil, active ingredients include both cannabinoids and terpenes. However, for the sake



An important factor to be considered is that both dosage and duration of use depend largely on the reason the individual is using CBD.

of simplicity, we'll focus on the bioavailability of CBD itself for now.

A bioavailability of 100 percent would signify that 100 percent of the CBD in the product is available to your body. The only way to achieve 100 percent bioavailability is through intravenous administration — meaning direct injection into the bloodstream.

Every other method of consumption besides injection will result in some percentage of the CBD becoming unavailable to the body. This may be a result of the CBD becoming trapped in fatty tissues, or metabolized (broken down) before it has a chance to enter the bloodstream.

Each method of CBD oil consumption has a particular range

of bioavailability. We'll discuss the factors that impact bioavailability next.

Bioavailability of CBD Tinctures

A tincture is a liquid — usually in the form an oil or an alcohol — which has been infused with concentrated CBD oil.

Tinctures are used sublingually, held under the tongue before complete ingestion. When delivered via this method, CBD can be absorbed directly into the bloodstream via the veins and blood vessels of the mouth.

The bioavailability of CBD taken in tincture form is anywhere from 5 percent to 15 percent. This makes tinctures a less than ideal delivery method for those who plan to use CBD consistently.

Bioavailability of Inhaled CBD

Aside from intravenous injection, the delivery method with the highest bioavailability is vaporization. The vapor is absorbed

into your lungs in the same way that oxygen is. Plus, the effects of inhalation are almost immediate as CBD passes through the membranes of the lungs.

The bioavailability of inhaled CBD ranges between 25 percent and 60 percent. Within this range, the actual number varies with other factors, including inhalation volume and depth.

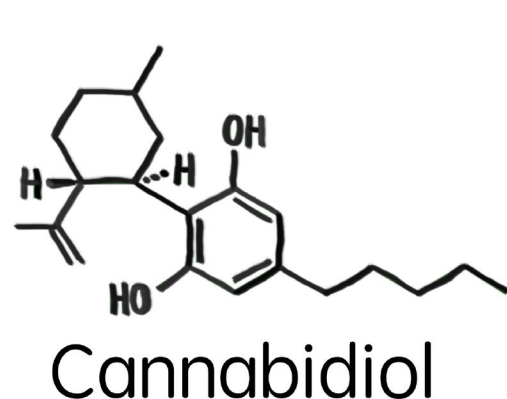
CBD OIL DELIVERY METHODS

Let's now take a look at some of the CBD oil delivery methods that are available and the pros and cons of each, in order to help you to determine which product, or products, are right for you.

Some of the factors that should be considered when determining which product is ideal for you are your lifestyle, the reasons you're using CBD oil, such as for cannabinoid supplementation or for a particular condition, the onset time of the delivery method, and the bioavailability of the method.

Lifestyle Considerations

In regards to lifestyle, some products are more convenient than others, some products travel better than others, and some products are simply more enjoyable to use than others. Capsules are preferred for traveling or endurance training, for instance.



If your lifestyle is particularly active, you may also want to take more CBD more frequently. Remember that CBD helps one adapt to stress — as an endurance athlete, you'll want to take full advantage of that.

Conditional Considerations

Certain delivery methods are better for certain conditions. For example, if you're using CBD for a skin condition, you can take it directly by using a topical product. Topicals may also be the way to go if you have localized pain.

But again, consult with a qualified medical professional to discuss the methods of administration which would be best for you.

Onset Time Considerations

As mentioned, various methods of administration require different amounts of time to take effect. For example, edibles can take upwards of the hour or more to take effect, whereas inhalation methods are virtually instantaneous.

Bioavailability Considerations

Bioavailability, as we pointed out earlier, is the amount of CBD that actually makes its way into your bloodstream. If a product has only 10% bioavailability, you're essentially paying five times more for your CBD than if you used a product which has a 50% bioavailability. Another possibility: if a CBD isolate product and a full spectrum product cost the same amount,

you can bet the full spectrum product is effectively much cheaper!

Dosage Considerations

Another consideration is the accuracy level you would like with your dosage. It's easy to gauge dosage when you're taking capsules, for example, but it can be harder to gauge dosage when vaping or taking an oil. This is not normally a big deal, but might be good to consider for those who find that they're sensitive to CBD.

With that knowledge, let's take a closer look at the best uses, and pros and cons, of individual delivery methods.

CBD Oils and Tinctures

Earlier, we discussed the fact that there are a variety of products referred to as CBD oil. These can include everything from raw hemp extract, to more refined products, to pure CBD-infused oil. Some CBD oil products also contain added ingredients like terpenes, essential oils, vitamins, or botanicals.

Oral vs. Sublingual Administration

What we have not discussed is that there are also two types of CBD oil tinctures. The first, which we have described, are oil-based tinctures. However, there are also alcohol-based tinctures. Whereas oil-based products can be used both orally and sublingually (under the tongue), alcohol-based tinctures are generally only used sublingually.

Alcohol tinctures have a faster onset time and a higher

bioavailability than oil-based tinctures. This doesn't mean alcohol is necessarily a better choice. In fact, alcohol tinctures are generally not full-spectrum products and do not provide the added benefits you'll get from the additional cannabinoids and the terpenes found in full-spectrum products.

To use a tincture, simply place the recommended amount of drops, or volume of oil, under your tongue where it can be absorbed directly into your bloodstream.

Pros and Cons of Oils and Tinctures

Tinctures are generally used at home in the morning and the evening, and can also be used at work if your situation allows it. As mentioned they can have a relatively quick onset time and higher bioavailability than edibles, and so are a better choice if you suffer from conditions such as anxiety.

The downside of tinctures and oils is that they don't travel well. They can be messy if you're trying to use them on the go. They also generally come in a breakable bottle with a breakable dropper. If you're looking for a product to take hiking, for example, tinctures are probably not your best choice.

CBD Oil Capsules

CBD oil capsules are generally delivered orally. There are cases where you might want to puncture a capsule for use on the skin, but for the most part, this is an orally administered

product.

Capsules are made with gelatin which melts with minutes in your stomach delivering the entire dosage of CBD oil to the stomach. This means that none of it will get absorbed into the tissues in your mouth or throat. Capsules may be the best choice for those hoping to improve their digestive health.

Pros and Cons of Capsules

Capsules are convenient, practical, and also allow for exact dosing. If a capsule contains 25 milligrams of CBD, you know you're getting a dosage of 25 milligrams of CBD.

Unless the capsule is water soluble, the downsides of capsules is their longer onset time. When taken on an empty stomach, very little of a capsule's CBD will make its way into your intestines, as most of it will be directly absorbed into the lining of your stomach. But this is easily avoidable by taking the capsule with food. The exception to this rule is water-soluble CBD. Water-soluble CBD is best taken on an empty stomach as it does need food to bind to in order to get into the bloodstream.

It's also important to note that capsules which do not use nanoemulsions have far lower bioavailability than those which do contain nanoemulsions.

Nanoemulsion

Venga CBD capsules are formulated using a patent-pending, water soluble nanoemulsion technology which encapsulates the active compounds in nano-sized emulsions. The average size of our nano-emulsified CBD molecules is between 4 and 200 times smaller than the industry standard. This smaller size leads to much higher absorption in the blood and therefore much higher bioavailability. Because of this, less nano CBD oil is needed to produce the same results as regular CBD oil – it's much more effective per unit. Water soluble CBD solutions deliver up to 5 times the CBD in the bloodstream over standard CBD products.

CBD-Infused Topicals

CBD-infused topicals include skin creams, balms, salves, and oils. Once again, these products can be infused with pure CBD, or they can contain a full spectrum CBD oil. As always, full spectrum CBD is best.

Topicals often have a variety of additional ingredients meant to contribute to overall therapeutic effects. For example, skin creams may contain moisturizers, vitamin E, collagen, or additional essential oils. Pain creams may contain ingredients, like menthol, meant to help the product penetrate deeper into tissues and aid in pain relief. Salves may contain other soothing and healing ingredients such as aloe. Overall, the alleviation of pain is one of our customers' favorite benefits of CBD – and one that is best obtained through

topical use!

Topical products can be very simple, as well. Even normal CBD oil can be used as a topical if it's applied directly to the skin. CBD-rich oils are great for moisturizing. They provide antioxidant and anti-inflammatory properties to protect skin from damage. CBD oils often contain vitamins and minerals, amino acids, and so on which are produced naturally along with the oil.

Pros and Cons of Topicals

Topicals are great for use on muscle groups and joints. When applied this way, CBD is able to reach impacted areas and do the most good. It may help reduce the DOMS, or delayed onset muscle soreness, that often happens after an intense workout. CBD may also help reduce cramping from electrolyte imbalances. While that's theoretical, studies point to CBD increasing the electrical charge of surface tissues.

But topicals also take some time to apply, and they can be a little messy. This may not be a concern for you if you use these kinds of products regularly. It's not a problem in the right settings, either: CBD makes a great addition to massage oil.

Another consideration: topical CBD use only benefits the areas to which it's directly applied. So if overall skin health is

your goal, you may just opt for consistent CBD oil or vaporizer use.

Inhalation Methods

There are two devices use to prepare CBD for inhalation – vaporizers and nebulizers. Vaporizers essentially heat a CBD oil preparation to a temperature where it evaporates into a gas. These are very popular and easy to find. Nebulizers simply convert a solution containing CBD into a mist or cloud and are less common at this time.

Pros and Cons of Inhalation

The faster onset time and higher bioavailability are obvious benefits of inhalation methods.

Nebulizers provide the added benefit of providing a measured dose, whereas delivering an exact dosage of CBD using a vaporizer is trickier. This is because most vaporizers – or vape pens, as they are commonly referred to – are not designed to vaporize an exact amount of solution. A lot depends on how big a puff a user takes and how deeply it is inhaled.

Another potential downside of vaporizers is that some ingredients are believed to be harmful when vaporized. For example, many vape oil solutions contain a petroleum-based chemical known as polyethylene glycol (PEG) – the same stuff that's used as a coolant and antifreeze in car radiators. Although this product has been approved by the FDA for use



Ideal dosage of CBD depends on a variety of factors including the product being used, the concentration of the CBD in the product, genetic makeup, sex, weight, and so on.

in foods, some studies have suggested that vaporized PEG can be harmful to the lungs.

ADDITIONAL CBD DOSING INFORMATION

How Long Does CBD Oil Take To Take Effect?

There are several things that come into play when determining the onset time of various methods of administration of CBD oil. Some of these variables are related to CBD itself, and others are related to how the human body reacts to CBD.

Because of unique genetics, no two people react to CBD oil in the same way. Furthermore, factors such as age, health, weight, circulation, and metabolism can all affect the onset of CBD oil.

The biggest factor? **Endocannabinoid health**. Someone deficient in endocannabinoids typically requires more CBD to compensate; this person may not respond to dosing immediately. On the other hand, an individual who expresses fewer endocannabinoid receptors or produces more endocannabinoids may be more sensitive to CBD.

Onset time depends on the delivery method used, too. As we mentioned, the onset time of inhaled CBD is virtually instantaneous. The onset time of edibles and capsules can range anywhere from 20 minutes to over an hour. And the

onset time of tinctures can be up to 30 minutes. Keep in mind, though that these figures are considered general guidelines that may vary from person to person.

CBD Oil Dosage Recommendations

As with bioavailability and onset time, the ideal dosage of CBD depends on a variety of factors including the product being used, the concentration of the CBD in the product, genetic makeup, sex, weight, and so on.

Some CBD products list a “recommended serving size.” But without taking into account all of the variables, the recommended serving size might be far too low or too high. In general, the more health problems one has, the more CBD they’ll need. Those under heavy stress from environmental stress or even from exercise (yes, exercise can be a form of eustress) also usually require a higher dose. But even two people with the same health status or training plan will often vary in their dosing needs. This goes back to variances in endocannabinoid levels, as we mentioned above.

The most important factor to be considered is that both dosage and duration of use depend largely on the reason the individual is using CBD. One person might simply be using CBD to support health and wellness, while another might be using CBD for a particular ailment.

Yet another factor? Whether or not the product being used is a full-spectrum CBD oil or not. Remember that the entourage

effect makes CBD much more potent and efficient! The terpene myrcene, for example, is known to make the brain-blood barrier more permeable, effectively reducing the required dosage for brain conditions.

As you can probably deduce from all these factors, finding your ideal CBD dosage may be a process. A dose that's too low will not produce the desired effect, at least not quickly. Alternatively, taking more than you need probably won't provide additional health benefits.

It may take some research and experimentation for you to determine your ideal dose. We'd encourage you to approach dosing with the same focus and mindfulness you direct towards your athletic training. As you've already experienced, getting to know your body takes time!

Supplemental Dosages

The method for determining CBD dosage for general health maintenance is different than determining dosage required for a particular ailment. Here are some guidelines that will help in either case:

Stick With One Product

It's a good idea to put some thought into which product you're going to use and stick with that product for a while. This allows you to gauge the effects of that particular product. Switching between different products could make determining dosage much harder.

Start With a Low Dose

When you first begin using CBD oil, it's a good idea to start with a low dosage. This gives you a chance to determine your body's unique reaction to CBD. Most experts recommend starting with 1 mg of CBD for every 20 pounds of weight. Using this rule, someone weighing 150 pounds should start with 7.5 milligrams of CBD, while someone weighing 200 pounds can start with 10 milligrams.

Start Before Bedtime

When first using CBD oil, it's best to start at night — about an hour before bedtime. That way, if CBD has a tendency to make you drowsy, you're not slowed down during the daytime. While it's uncommon for a low dosage of CBD to cause drowsiness, it's also good to be sure!

If everything feels good, take another dose in the morning. If CBD oil does make you sleepy, take it at night. Oftentimes CBD helps with both nighttime sleep and daytime focus, in which case it can be taken multiple times throughout the day.

Increase Your Dosage Slowly

If all goes well but you have not achieved your desired results, try doubling your dose. Each time you increase your dosage take a few days to make note of your condition including factors such as energy, sleep, mood, pain levels, etc. You can expect pain reduction fairly fast, and with a minimum of side effects — especially if you're used to using more conventional painkillers.

Once you've reached the right dose, feel free to play around with it. You might take slightly more CBD around intense workouts, for example. You could also supplement with topical CBD use, which is great for pain relief. In fact, pain relief is one of the biggest reasons our customers take CBD. The possibilities are endless!

Treating Medical Conditions

If you are trying to treat a particular ailment with CBD oil, talk to a medical professional who is knowledgeable in the use of CBD before proceeding. Your condition may require larger doses of CBD than you would typically take for health maintenance.

Also, try to reach out to people who are successfully using CBD for your condition. There are websites dedicated to every ailment you can think of.

Can you take too much CBD oil?

No, CBD is completely non-toxic. Research into CBD's effects on the human body has shown that the plant molecule is very well tolerated. You would have to consume huge amounts of CBD oil before it results in so much as a minor side effect. There is no known record of anyone ever overdosing, or being poisoned, by CBD.

However, taking more CBD than needed might cause some unwanted effects such as making you too relaxed for particular activities such as work or sports.

Once you have arrived at a particular dosage based on the product you are using, it's a good idea to stick with that product.

KEY TAKEAWAYS

1. Bioavailability refers to the percentage of a compound that enters the bloodstream intact.
2. No two people react to CBD oil in the same way. Factors such as age, health, weight, circulation, and metabolism can all affect the onset of CBD oil.
3. CBD is completely non-toxic. There is no known record of anyone ever overdosing, or being poisoned, by CBD.
4. Experiment with dosage levels to find what's effective for you.

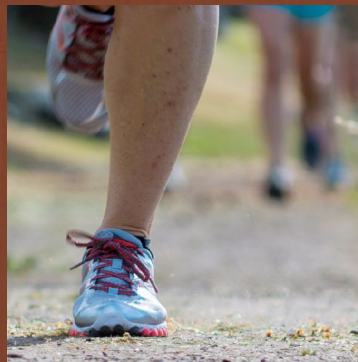


CHAPTER 6

CBD RESEARCH

Many insightful studies about CBD and its relationship to the human body have already been published.

In this chapter, we'll take a look at some of them. We'll also look at a few of the health conditions for which treatment with CBD has been approved at both the state and federal levels.



WHAT THE RESEARCH SAYS ABOUT CBD

In just over a half century, cannabinoids have gone from relative obscurity to being one of the most researched plant compounds in the world.

The secrets of cannabinoids are vast, with many things yet to be explored. Even after many years of study, little is known about how cannabinoids interact with the endocannabinoid system. The Endocannabinoid system, in turn, interacts with pretty much everything else: the immune system, the nervous system, the endocrine system, the cardiovascular system, the digestive system, the heart, liver, and kidneys, the epidermis, and others. This makes research on the topic pretty nuanced.

But one thing is certain — CBD does have an effect on each one of these complex systems. Determining the exact mechanisms responsible for CBD's health benefits



might take many more decades.

In the meantime, research continues to slowly progress. Many insightful studies about CBD and its relationship to the human body have already been published. In this chapter, we'll take a look at some of them. We'll also look at a few of the health conditions for which treatment with CBD has been approved at both the state and federal levels.

History of CBD Research

In 1968, the University of Mississippi was entrusted with growing marijuana for research purposes by none other than the predecessor agency to the DEA. That same year, a report written by the UK government's Advisory Committee on Drug Dependence stated that "the long-term consumption of cannabis in moderate doses has no harmful effects... Cannabis is less dangerous than the opiates, amphetamines and barbiturates, and also less dangerous than alcohol..."

Yet only two years later, the United States declared marijuana a Class I substance with a high potential for abuse and no medicinal value. Two years after that, in 1972, a report based on a comprehensive study by the Department of Health, Education and Welfare recommended that marijuana be removed from the scheduling system and decriminalized. President Richard Nixon rejected these recommendations.

A 1976 court battle complicated things; federal Judges ruled in favor of a man that was using marijuana out of 'medical necessity'. With that the plaintiff, Robert Randall, became the first legal medical cannabis patient.

In 1978, as a direct result of the lawsuit, the National Institute on Drug Abuse (NIDA) began supplying cannabis to several patients whose physicians applied for and received 'compassionate use' rights under Investigational New Drug Applications (IND) rules. Most of the medical research done on cannabis has taken place in the 40 years since 1978.

It wasn't until 1992 — twenty years after the discovery of THC — that internal endocannabinoid production was proven.

The human endocannabinoid system was discovered in stages in the early 90's. This resulted in a wave of new studies into the pharmacological effects of cannabinoids. It wasn't until 1992 — twenty years after the discovery of THC — that internal endocannabinoid production was proven. The first identified endocannabinoid, anandamide, was nicknamed "the bliss molecule" because of its tremendous impact on happiness and mental health.

In 1993, as research results began to pour in, the American Medical Student Association unanimously endorsed a statement calling for the down-scheduling of Cannabis to Schedule 2. Since that time there have been scores of other attempts to convince the federal government to relent on this matter, but so far, none have been successful.

Let's now take a look at some of the research that has been done in the past few decades into the mechanisms and effects of cannabinoids and the ECS.

Research Studies On CBD

A non-profit CBD information source known as Project CBD maintains a comprehensive list of conditions for which the potential therapeutic effects of CBD are being studied.

The evidence presented in these studies is pretty convincing, and points to one conclusion: there is a vast array of human

ailments which seem to respond well to CBD.

Here’s a list of some of the conditions upon which CBD’s effects have been, or are being, studied:

Acne	Asthma	ADD
ADHD	Addiction	Anorexia
Antibiotic Resistance	Anxiety	Arthritis
Bipolar Conditions	Digestive Issues	Depression
Inflammation	Chronic Pain	Obesity
OCD	Migraine	Mood Disorders
Motion Sickness	Skin Conditions	Sleep Disorders
Spinal Cord Injury	Stress	

Let’s now take a look at some of the individual studies:

Research Into CBD’s Effects On Mood Disorders

One of the most common targets of study into CBD’s effects are mood disorders, like anxiety and depression. Much of this research suggests that CBD might have a positive effect on these disorders.

We mentioned earlier that CBD raises levels of the endocannabinoid anandamide. Anandamide is produced by the nervous system to stimulate the uptake of serotonin in the brain. Serotonin is often referred to as the “happy molecule” because of its ability to improve mood.

People suffering from mood disorders such as anxiety and depression commonly show low levels of serotonin. An increase in serotonin can correspond to an increase in feelings of wellbeing. Research results suggest that CBD might provide an effective remedy for both anxiety disorders and major depression.

In 2009, The British Journal of Pharmacology published findings from a Brazilian study on CBD’s effects on anxiety in a report titled, “5-HT1A receptors are involved in the cannabidiol-induced attenuation of behavioural and cardiovascular responses to acute restraint stress in rats.”

Authors of the report concluded that “CBD can attenuate acute autonomic responses to stress and its delayed emotional consequences by facilitating 5-HT1A receptor-mediated neurotransmission.” In other words, CBD reduces stress by helping serotonin levels bounce back.

A group of UK and Brazilian researchers studied the effects of Cannabidiol on anxiety, fear and trauma. They published their findings in the 2016 December issue of Frontiers in

Pharmacology in a report entitled, “Bidirectional Effects of Cannabidiol on Contextual Fear Memory Extinction.”

The study involved mice that had been subjected to fear conditioning. Its authors discovered something amazing: CBD use “reduced contextual fear memory expression.” This suggests that CBD might be of help to those who suffer from conditions such as PTSD.

Research Into CBD’s Effects On Sleeping Disorders

The human body relies on what we call circadian rhythm to properly time different health functions. Our brains determine which activities a cell should be undertaking at which times of day, and our nervous system and endocrine system work together to keep cells on a daily schedule. It’s especially important that one’s circadian rhythm stays ‘in sync’ with the natural rhythms of the sun. If this synchronization is broken, sleep apnea, insomnia, or just general poor sleep can result.

Research suggests that CBD helps balance the body’s circadian rhythms.

Research suggests that CBD helps balance the body’s circadian rhythms. In fact, many people who use CBD claim that they not only sleep better at night, but also have more

energy and alertness during the day.

A research review of cannabinoids on sleep disorders, “Cannabidiol in Humans—The Quest for Therapeutic Targets,” was published in the journal Current Psychiatry. The report states that “Medium and high-dose CBD is sedating, and has been examined in the context of a number of sleep disorders including insomnia. Initial basic research has suggested that medium-/high-dose CBD is associated with an increase in the percentage of total sleep.”

Another report on CBD’s effects on sleep disorders, authored by the University of Colorado School of Medicine and the Wholeness Center, was published in The Permanente Journal. In the report, entitled, “Effectiveness of Cannabidiol Oil for Pediatric Anxiety and Insomnia as Part of Posttraumatic Stress Disorder: A Case Report,” the authors made some interesting conclusions.

“Pharmaceutical medications provided partial relief, but results were not long-lasting, and there were major side effects. A trial of cannabidiol oil resulted in a maintained decrease in anxiety and a steady improvement in the quality and quantity of the patient’s sleep.” In this study, CBD was both more holistic and more reliable than conventional aids — that’s a pharmacological win-win.

CBD as an Antioxidant

Antioxidants can be thought of as molecular remediators. They counter metabolic byproducts called free radicals and render them harmless. Free radicals can hurt cellular health and healthy gene expression, contributing to disease and aging over the long term. That makes combating them through antioxidant use important to everyone, especially athletes.

In the context of exercise, antioxidants like CBD may reduce inflammation, reduce DOMS, and speed recovery from intense workouts. CBD even boosts levels of an endogenous antioxidant called glutathione — many times better than vitamin C, at that.

Federally Recognized Medical Conditions

An FDA panel recently recommended approval of a CBD-based pharmaceutical called Epidiolex for treatment of intractable epilepsy. This came after a series of studies that conclusively showed CBD's benefits for epileptic patients.

Another concession by the federal government involves the Department of Veterans Affairs. In mid-June 2018, the Senate Appropriations Committee voted to add an amendment to the Department of Veterans Affairs' (VA) annual spending bill that would prohibit VA interference in the participation in legal cannabis programs by US veterans. The amendment prohibits the VA from denying any services to veterans who use medical cannabis.

The amendment reverses a VA directive that prevents its physicians from helping veterans access medical cannabis. It also directs the VA to conduct research into the benefits of medical cannabis using whole plant cannabis and extracts. This would include CBD oil.

KEY TAKEAWAYS

1. The human endocannabinoid system was discovered in stages in the early 90's.
2. Much of the research into CBD's effects on mood disorders suggests that CBD might have a positive effect on these disorders.
3. An FDA panel recently recommended approval of a CBD-based pharmaceutical called Epidiolex for treatment of intractable epilepsy.

APPENDIX

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A CONDENSED HISTORY OF CBD

CBD oil has a long and influential past. It might seem surprising, then, that as little as a quarter of a century ago almost no one had ever heard of the molecule. That's all changed in the past couple decades, though, and now things are coming full circle. Today modern science has identified a family of plant compounds known as cannabinoids, and a messenger system that matches them: the human endocannabinoid system.

Even now, though, we're just beginning to understand how CBD affects the human body. A look back throughout history might help reveal more.

The earliest written record of cannabis use appears in ancient China around 6000 BC — just after the dawn of human civilization. More direct evidence of the plant's use as medicine began to emerge around 3,000 years later; in 2737 BC, as recorded in the first editions of the Pen Ts'ao Ching, Chinese emperor Shen-Nung was using cannabis in topical ointments and teas to aid in pain relief.

As time went on and human civilization progressed, writings espousing the medicinal benefits of hemp started to appear in pharmacopoeias across all of Asia. Cannabis extract began to be used as a blood thinner and anaesthetic, according to the second century BC writing of Hua Tuo.

The Romans began using hemp extensively in the healing arts, too, beginning around the year 77. Pliny the Elder, in his enormous written volumes, claimed that cannabis extract was helpful for pain relief.

In India, cannabis was considered a sacred plant, graciously gifted to mankind by the gods. The Atharva Veda manuscripts, considered a storehouse of useful knowledge, detailed the use of hemp flowers and seeds in a variety of topical preparations. And they weren't the only ones who took this viewpoint. The forefathers of Judaism, the ancient Hebrews, most likely also used cannabis in their spiritual anointing oils.

Hemp During the Renaissance

By the sixteenth century, cannabis was prominently featured throughout Europe. Hemp was so valuable to the society of that day that in 1533 Henry VIII required all farmers to cultivate it. Many physicians, too, were touting hemp as medicine. Among them, Garcia de Orta and Li Shih-Chen were documenting the use of hemp extract as an appetite stimulant and antibiotic.

In the 1600's, hemp came to North America colonies. The

plant was soon legally mandated, just like it had been in Europe: Virginia was first to create laws which required the cultivation of hemp by farmers. Similar laws were passed in Massachusetts and Connecticut. Hemp seeds were even considered legal tender and used to pay for goods and services in Virginia, Pennsylvania, and Maryland.

A popular medical text of the time, "Anatomy of Melancholy," written by Robert Burton, noted that hemp extract was helpful in dealing with mental health disorders. Other leading medical books suggested the same. By the eighteenth century, hemp's medicinal uses were documented in "The New England Dispensatory" and "Edinburgh New Dispensatory", both highly respected pharmacopoeias.

As the industrial age was unfolding, a surgeon named W.B. O'Shaughnessy rediscovered the virtues of hemp remedies in the American Southwest. A professor at the Medical College of Calcutta. O'Shaughnessy conducted experiments to determine the effects of hemp extracts on animals and humans suffering from rheumatic diseases, cholera, tetanus and hydrophobia. Perhaps even more significantly, he observed and documented hemp's widespread medical use in native Indian culture. His writings discussed the ability of hemp extracts to relieve pain and relax spastic muscles.

Hemp extract is also listed in the third edition of the U.S. Pharmacopeia as a pain reliever, sleep aid and antidepressant. And near the end of the 1800's century, a

doctor named J.R. Reynolds was conducting research into the ability of hemp extract to reduce tics and treat asthma.

CBD Oil In Modern Times: Prohibition

With the turn of the 20th century came the development of opioids and other powerful narcotics. Medications which combined cannabis with the new pharmaceuticals became popular; these potent mixes were used in everything from cough syrup to sleep aids. The use of cannabis-only preparations, however, began to decline.

By the late 1930's, the war on cannabis erupted. The plant's cultivation became illegal, and federal agents ripped up wild growing hemp all throughout the countryside. Even the plant's name was tarnished; it was rebranded as the Spanish word 'marijuana' in order to scare away a racially-sensitive culture.

Mandates against cannabis cultivation became even stricter with the passing of the Controlled Substances Act (CSA) in 1970. The CSA listed cannabis — including both hemp and marijuana — as Schedule I substances with no medicinal benefits and a high risk of dependence.

While the federal government was busy banning cannabis, early pioneers were busy researching it. In the late 1960's Cannabidiol (CBD), the major non-psychoactive cannabinoid, was discovered. More discoveries began to unfold as scientists uncovered the role of cannabinoids in maintaining good health. We'll discuss this in more detail shortly.

As the 1970's progressed, however, cannabis extracts were once again being used for healing. A quarter of a century later, in 1996, the state of California legalized the medicinal use of cannabis for the treatment of a list of serious medical conditions.

In 1993 came the biggest discovery yet: Dr. Raphael Mechoulam and his team fully identified the endocannabinoid system (ECS). Suddenly, it all made sense — this was why CBD worked so well. [1]

But this was just the beginning. The discovery of the ECS set off an entire cascade of scientific interest. Over the past few decades, there has been an explosion of research into the health benefits of CBD and the way it interacts with the human body.

CBD has been quickly gaining acceptance in the U.S. as a result of media coverage by respected health experts such as Dr. Sanjay Gupta. What began with a small grassroots effort has now blossomed into much more, and today, CBD oil is available to everyone. The reality of CBD's healing power is beginning to reach the masses.

Modern technology has provided methods of refining and isolating CBD. Normally, CBD isn't absorbed by the body all that well, but new methods have found a way to overcome this problem. One even increases the bioavailability of CBD oil through nanoemulsions which make the compound smaller, more water-soluble, and much more potent.

The future of CBD is bright in more areas than just tech. Demand for CBD is growing so quickly that sales are expected to surpass \$1 billion by 2020. [2] Recently analysts hinted at upping these projections: sales might actually break through \$22 billion by 2022. Perhaps the most impressive part of this growth is that much of it's occurred organically, through word of mouth. [3]

[1] <https://echoconnection.org/discovery-endocannabinoid-system/>

[2] <https://www.forbes.com/sites/debraborchardt/2017/08/23/hemp-cannabis-product-sales-projected-to-hit-a-billion-dollars-in-3-years/#636f40ee474c>

[3]

<https://www.rollingstone.com/culture/culture-news/new-study-cbd-market-22-billion-2022-722852/>

For more information visit www.vengaCBD.com

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