

EIGHTH REVOLUTION

MONTHLY PLAYBOOK

CANNABIS & HEMP

PLATINUM



APRIL 2021

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APRIL 2021

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**FOR QUESTIONS OR
MORE INFORMATION,
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DEAR READER,

We want to thank you for your trust, and most importantly, your time. With the endless amount of resources at your disposal, we appreciate you leaning on us as your guide through the muddy waters of this industry's limitless news and intelligence.

We at Eighth Revolution initially created this document to help our partners understand how their short-term decisions were having long-term effects on the success of their businesses. In an industry that changes as aggressively as ours, we can't stress the importance of effective decision making enough.

Though the information in the report is never meant to dictate specific actions or guarantee certain outcomes, we hope that we're able to provide another voice in the room, one that illuminates, simplifies, and supports you.

If you find one area more helpful than others and want us to expand on it, please never hesitate to reach out. For any suggestions or questions, we can be reached directly at bryan@8threv.com.

Welcome to the revolution.

Bryan Fields
CEO, CO-FOUNDER



Kellan Finney
CSO, CO-FOUNDER



APRIL 2020

A NOTE FROM YOUR PARTNERS

The change of the seasons brings warm weather, but lately, this isn't the only change we've been seeing. As we slough through rainy April with the hopes of soon seeing the sun, we also watch regulators shift their stance on cannabis and push for legislative change, and New York has been at the head of this charge. The CBD industry, on the other hand, is patiently waiting for their momentum to pick up, but good news could be on the way. With the current USDA study analyzing whether hemp can be used as an alternative for cattle feed underway, and the potential for CBD to become a nutraceutical this year, you have a potent combination that could send prices soaring. The future is exciting, and we look forward to being there with you every step of the way.

— Kellan Finney

Balancing the speed of the cannabinoid industry's growth with slow-changing regulations can be hard. On one side, the overwhelming desire for product and the ability to grow, process, produce, and sell has never been in higher demand. With more and more states coming online, the need to quickly scale or pivot is only compounding these supply chain stressors. On the flip side, policy makers, still hesitant to fully embrace the cannabinoid industry, continue to debate the finishing touches on game-changing legislation. It's important to remind yourself that, though this period may be frustrating for all those who want to start solidifying the space, every step forward is progress toward a new era. Try to remember that forward is forward, no matter how small of a step.

— Bryan Fields





“YOUR SPEED
DOESN'T MATTER,
FORWARD IS
FORWARD!”¹

LETTER FROM THE TEAM

When we discuss the challenges and hurdles facing the cannabinoid industry, we're often discussing obstacles that are unique to the space given its ongoing state of infancy. While concerns like client acquisition and sustainable scaling are matters that even mature industries brush up against, there's one problem in particular that exclusively exists as a thorn in the cannabinoid industry's side: banking.

Despite being legal, cannabis businesses are unable to use the services provided by secure banking institutions. The denial of such basic assistance has created unnecessary difficulties, ones that have proved detrimental to those looking to grow with the space as it expands. Exclusions

like these only perpetuate the negative stigma surrounding the plant, and since lobbyists recognize that such ostracism from financial institutions will continue to hinder the industry's progress, they have been campaigning to pass the SAFE Banking Act.

CEO of Cresco Labs, Charlie Bachtell, put it best when he spoke with CNBC's team over at Fast Money, claiming that "access to capital has been so difficult in this industry. And again, this is an industry that is the fastest growing industry in America. [It] increased to 320,000+ full-time employees in the industry last year - that's up 32%, so this is an incredibly fast-moving, dynamic industry that we have, you know, a hand tied behind our back

“[T]he federal agency would “prefer” for state-legal cannabis firms to be able to pay taxes electronically, as the current cash-based system under prohibition is onerous and presents risks to workers.”



without access to traditional banking.”²

“What is the SAFE Banking Act?”, you may ask. The SAFE Banking Act is a piece of proposed legislation that would allow financial institutions to take on clients within the cannabis sector without the risk of facing federal penalties or a DEA raid.^{3,4}

If this doesn’t sound like a monumental game changer, consider that the head of the IRS, Commissioner Charles Rettig, told Congress that “the federal agency would “prefer” for state-legal cannabis firms to be able to pay taxes electronically, as the current cash-based system under prohibition is onerous and presents risks to workers.”³ Forced to operate as cash-based businesses, the most well-known and successful MSOs have had to pay taxes with duffel bags of cash. This ridiculous mental visual only highlights the absurdity of excluding multi-million dollar companies from the accessibility of banking.

With such obvious reasons demonstrating why financial institutions should start allowing cannabinoid businesses to work with them, you may be wondering what’s been holding them back. The main issue comes in the form of compliance risk. Though many states have fully legalized cannabis, the plant is still illegal at the federal level, meaning the issue of sanctions is a very real and very serious threat that hangs over the heads of banks and credit unions thinking about expanding into the cannabis industry.³ Unfortunately, their fear of facing the potential ramifications of working within the space further endangers the ones operating in it, placing cannabinoid workers at a higher risk for targeted robberies.

While not the massive reform that many people hoped to see, the SAFE Banking Act is a critical piece of legislation and a crucial step towards creating a compliant industry that’s adding thousands of jobs, bringing in millions of dollars in tax revenue, and ensuring that Uncle Sam continues to get his piece of the pie.



DOMESTIC NEWS

LINKED
PAGE



FLORIDA

NEW MEXICO

DELAWARE

Florida Poll: THC Caps Unpopular, Support for Cannabis Growing

“A recent poll commissioned by Florida for Care found that support for medical cannabis in the state has increased and there is [little support in the state for THC caps](#), Florida Politics reports.”

New Mexico House Approves Marijuana Legalization Bill, With Senate Action Imminent

“The New Mexico House of Representatives on Friday [approved a bill to legalize marijuana in the state](#), one day ahead of a scheduled Senate committee hearing on that chamber’s separate proposals to end cannabis prohibition.”

Delaware Lawmakers File Marijuana Legalization Bill Despite Governor’s Ongoing ‘Concerns’s

“Delaware lawmakers on Thursday [introduced a much-anticipated bill to legalize marijuana in the state](#), though the governor’s ongoing concerns about the policy change continue to represent an obstacle.”

INTERNATIONAL *REGULATIONS*

SCOTLAND



“Regulators have approved Scotland’s first medicinal cannabis clinic. Stirling’s Sapphire Medical Clinics has been authorised by Healthcare Improvement Scotland to provide safe access to medical cannabis to Scottish patients. Business Insider reports that...”

GERMANY



“In collaboration with Nimbus Health, a leading medical cannabis distributor in Germany, Khiron is now positioned for imminent first sales in Germany. Khiron products are currently in inventory in the Nimbus warehouse, ready to be prescribed to patients and...”

MEXICO



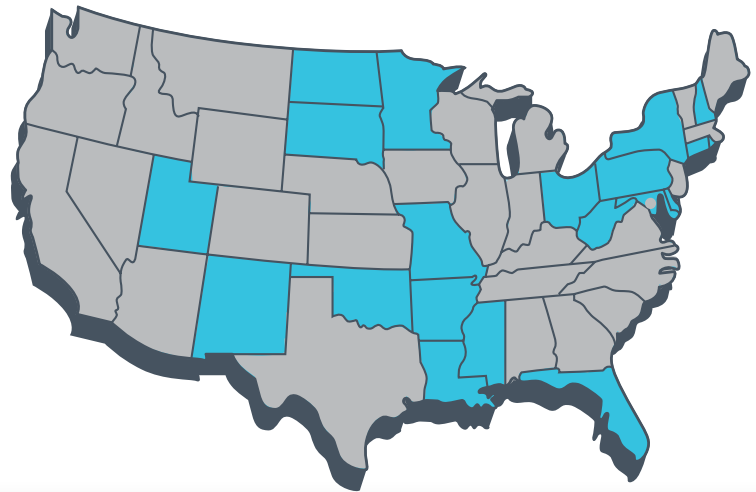
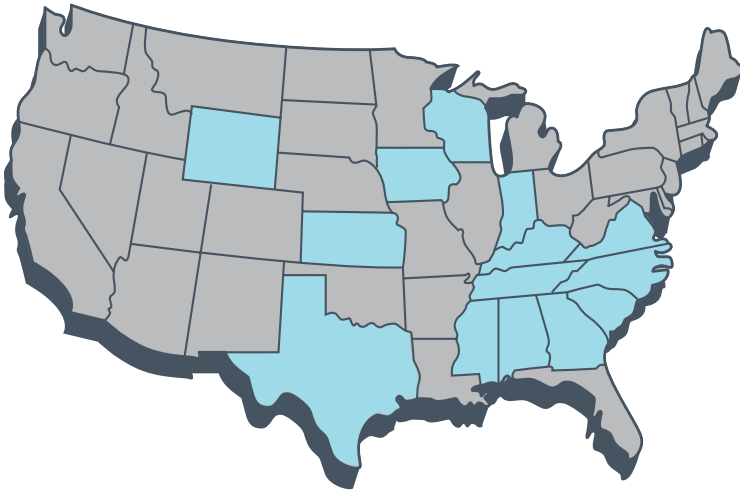
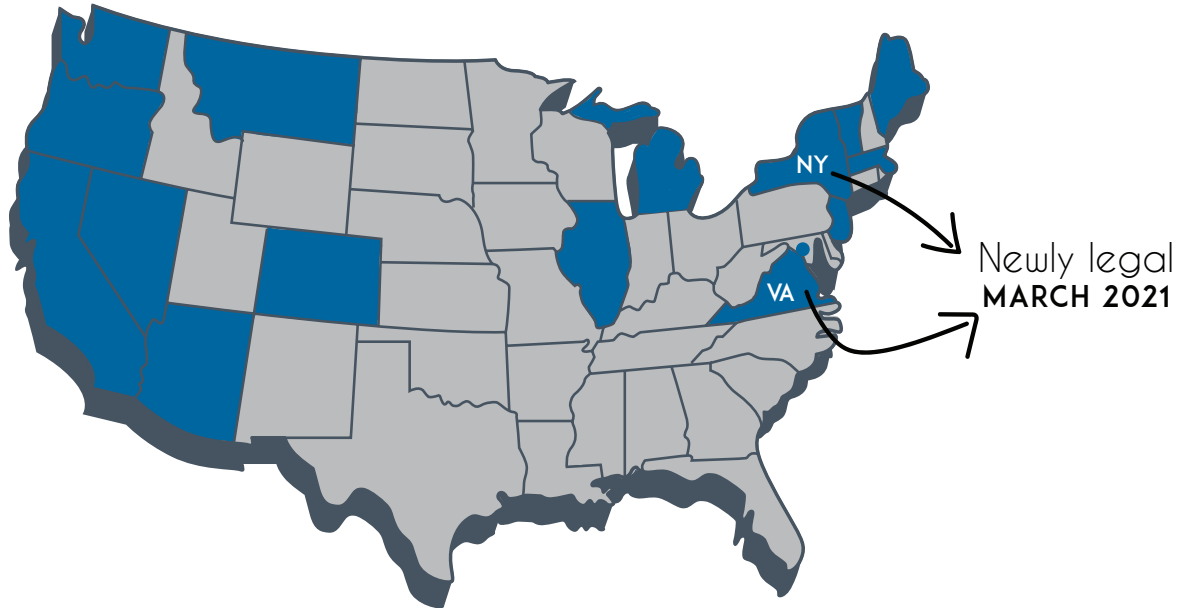
“Lawmakers in Mexico approved a bill Wednesday night to legalize recreational marijuana, a milestone for the country, which is in the throes of a drug war and could become the world’s largest cannabis market, leaving the United States between two...”

LEGALITY OF CANNABIS *IN THE UNITED STATES*



DID YOU NOTICE?

We've added some new brothers and sisters to our growing family!



ADULT-USE



MEDICALLY LEGAL
WITH LIMITED THC



MEDICALLY LEGAL



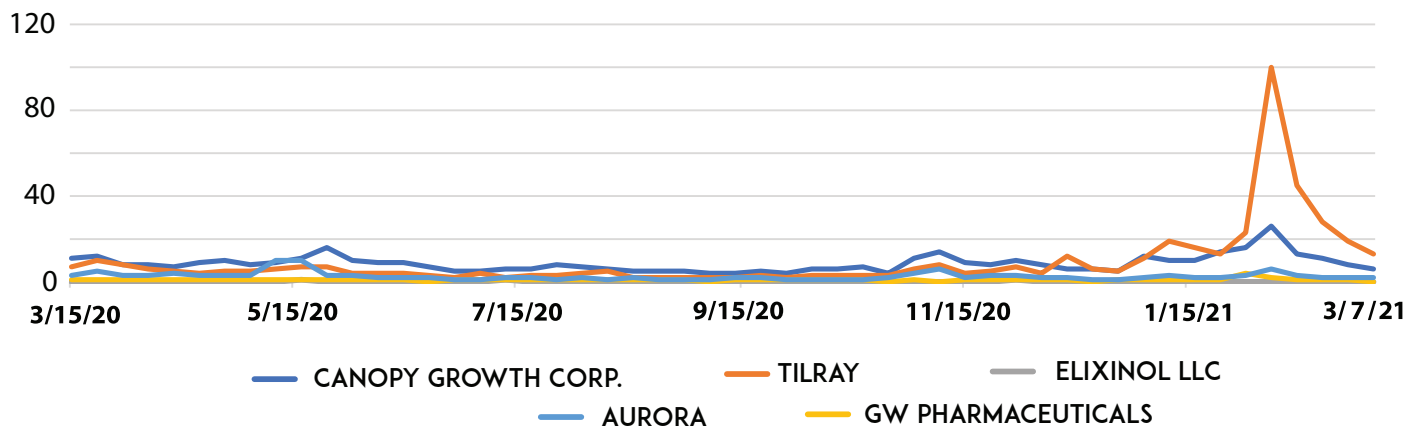
WORLDWIDE CANNABINOID SEARCH TRENDS

TOP GLOBAL CBD OIL SUPPLIERS

According to ThomasNet, the top global CBD oil suppliers by revenue are Canopy Growth Corporation, Tilray, Elixinol, GW Pharmaceuticals (recently acquired by Jazz Pharmaceuticals), and Aurora Cannabis.⁵

With almost double the revenue as the nearest competitor (which can be seen at the bottom of the page), we expected Canopy Growth to show the highest number of global searches, but instead, we saw Tilray take center stage as the company with the most searches.

GLOBAL SEARCH POPULARITY



NOTE:

Numbers represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term.

Tilray, a Peter Thiel backed cannabis company, is the first cGMP certified medical cannabis producer of dried flower and extracts. Their recent spike in search interest could be related to the popular Reddit forum, /r/wallstreetbets, singled out the stock for being heavily shorted. Along with its December 2020 merger with Aphria, this may have been a large contributor to its price surge within the last 90 days, and subsequently, its increase in search popularity.

FINANCIAL FIGURES FOR THE TOP 5 MOST SEARCHED COMPANIES

	TOP GLOBAL SUPPLIERS OF CBD OIL COMPANY	ESTIMATED ANNUAL REVENUE	SEARCH POPULARITY RANK
	Canopy Growth Corporation	\$ 77,900,000	2
	Tilray	\$ 43,130,000	1
	Elixinol LLC	\$ 37,100,000	5
	GW Pharmaceuticals	\$ 19,391,000	4
	Aurora Cannabis	\$ 19,147,000	3



WHOLESALE DATA

WHOLESALE HEMP GENETICS PRICING

INDUSTRIAL SEEDS \$4.03	CBD CLONES \$1.72
	CBG SEEDS \$0.84
CBG CLONES \$2.10	CBD SEEDS (FEMINIZED) \$0.70



NOTE:

The color represents the percent drop in price from the previous month.
The dollar amount refers to the price of the product in \$ / unit.

The pricing of genetics has seen several increases as spring approaches, with non-feminized CBD seeds seeing the most significant jump. The 12% price increase in this product category signals a potential move by farmers to grow the hemp crop using a lower maintenance plan. Because non-feminized seeds tend to be a 50-50 mix of males and females, the quality of the bud will significantly decrease. If the farmer is growing outdoors for extraction, this choice may not be an issue, as the lack of crop maintenance would translate to less labor costs and fees associated with technology used to distinguish between the male and female plants prior to flower.

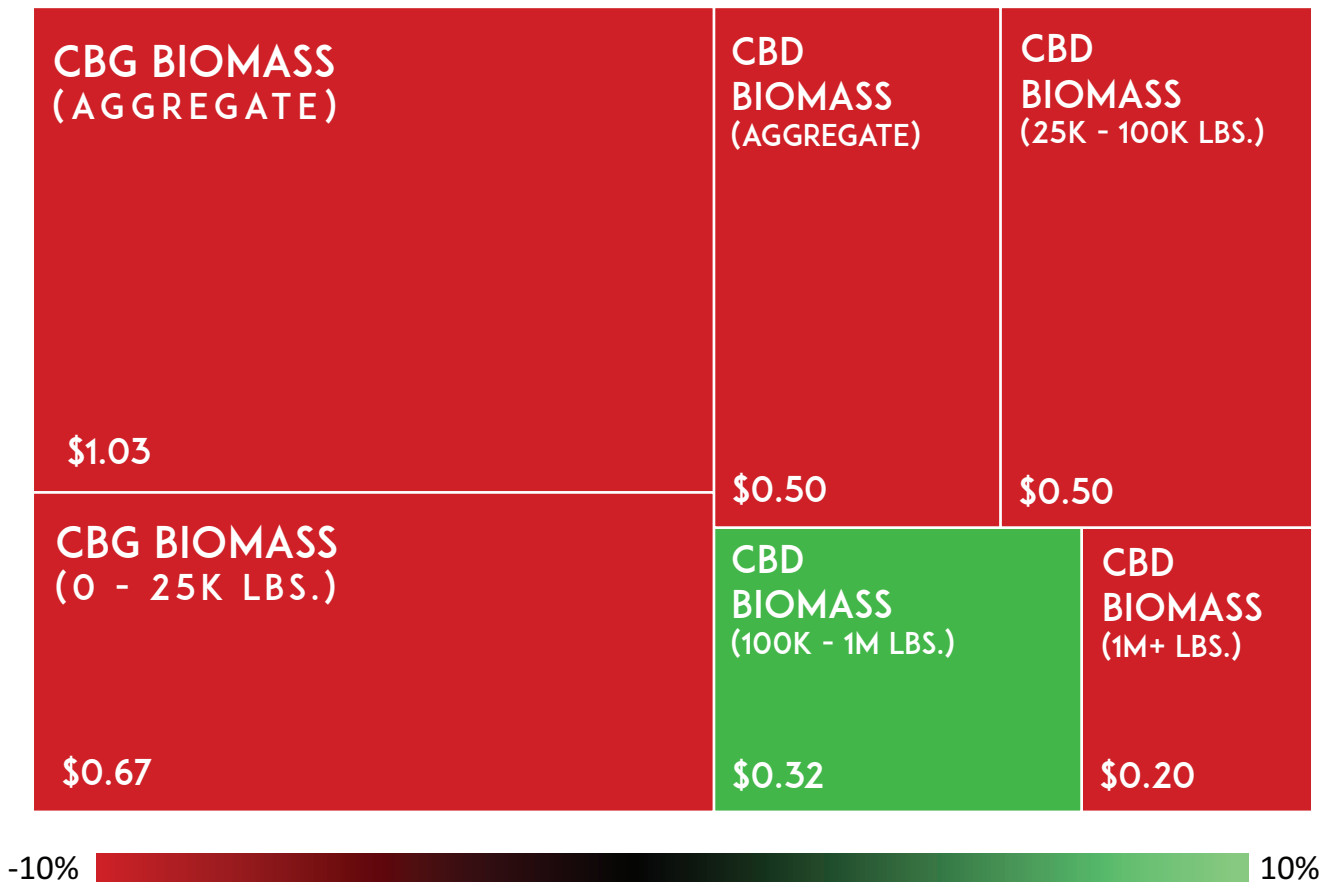
Implementing such technology is often costly and tends to become complicated upon expansion. Overall, utilizing non-feminized CBD seeds may be an enticing option for growers from a financial perspective.

The other data point supporting this thought process is the fact that feminized CBD seeds have decreased in price which suggests that farmers are moving away from expensive feminized seeds, ones that can run as high as \$1.50 / seed, to non-feminized seeds, which run around \$230 / lbs. Seeds per pound depend on the crop, but for a similar crop, the average seed count in a pound ranges from 160,000 – 275,000 seeds. The difference in price could result in some companies turning a profit while others record another year in the red.

CBG genetics continue to garner higher prices than their CBD counterparts with CBG clones averaging around \$2.10 per clone and CBD clones averaging around \$1.72 per clone, a 22% price difference.



WHOLESALE HEMP BIOMASS PRICING



NOTE:

The color represents the percent drop in price from the previous month. The dollar amount refers to the price of product in \$ / % CBD or CBG / lbs.

The biomass market continues to stabilize, even as most other product categories demonstrate pricing decreases when compared to the last month. The stark difference in percent decrease in biomass prices this year, when compared to the decrease from same time last year, illuminates that the volatility in pricing has lessened. The largest price decrease by percentage was from the 25K-100K pound CBD biomass category, with many seeing an 8% or \$0.04 decrease in CBD percentages from the previous month.

CBG biomass continues to fetch almost double the price as comparative quality CBD biomass. However, the volume of CBG being traded is significantly lower from a velocity and deal size than CBD biomass. Because the education and wellness benefits from CBG are still not known, the utility of the molecule is still not known, so we consider such interest in CBG to be the result of speculative play for the deployment of capital and the allocation of land.



WHOLESALE HEMP DERIVATIVE PRICING

CBG ISOLATE \$1,790	DISTILLATE (THC FREE) \$1,376	REFINED HEMP OIL (AGGREGATE) \$1,012	
CBG DISTILLATE \$1,440	DISTILLATE (BROAD SPECTRUM) \$864	DISTILLATE (FULL SPECTRUM) \$602	CRUDE HEMP OIL \$207

-10%  10%

NOTE:

The color represents the percent drop in price from the previous month. The dollar amount refers to the price of product in \$ / kilogram.

Most derivative products in the hemp space increased from last month, most notably full spectrum distillate and refined hemp oil which saw 15% and 13% price increases, respectively. The price difference between full spectrum and broad spectrum dropped to all time low of 18% or a \$262 / kg price difference.

It's important for manufacturers to note that the average price difference in 2020 was 22%, because the market value of downstream products produced in the chemical refinery process should be the factor that influences production volumes. In this example, we would advise our client that if it costs more than \$262 / kg to remove the THC from your full-spectrum oil, money could be left on the table by continuing to remediate that batch.

Interestingly, the price for both CBD and CBG isolate each fell by 3% from last month, which could be a sign that there were significantly larger isolate inventories held by companies than previously speculated.

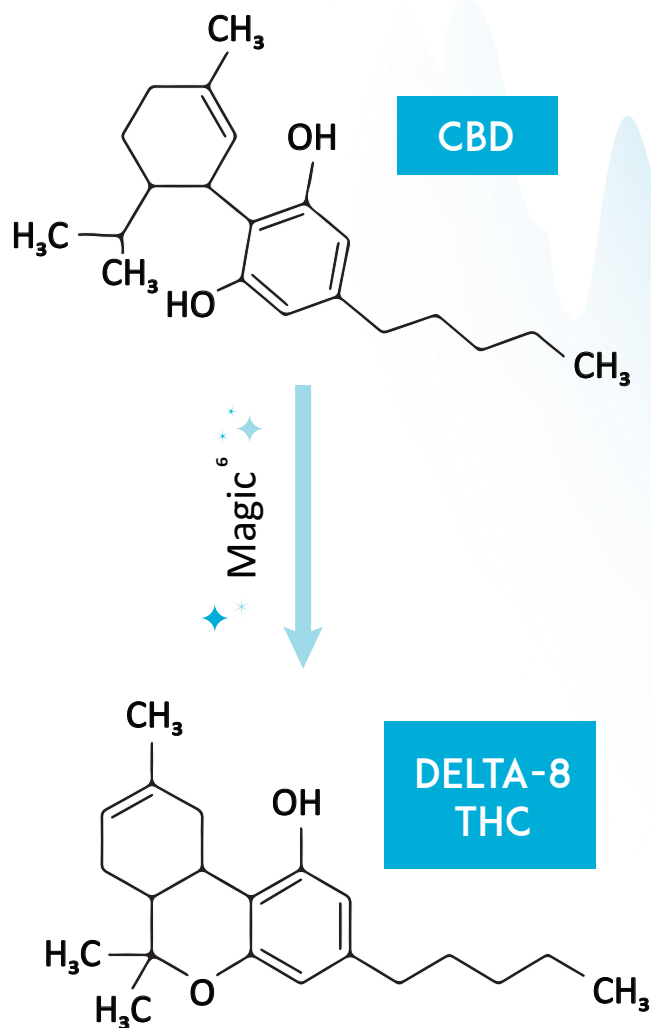


CBD & DELTA-8

WHAT IS THE REAL COST OF CONVERTING YOUR CBD TO DELTA-8?

Often derivative products are taken at face value when being compared. Currently, this is the case when we speak with operators about CBD and Delta-8 THC. The decision-making process always centers around comparing the price of 1 kg of CBD isolate (~\$533.00 / kg) to the price of 1 kg of CBG isolate (~\$1,150.00 / kg), which at the surface shows the potential to double the gross revenue.

Once you dive into the hard costs of converting your CBD inventory to Delta-8, the story changes dramatically. Below, we go through a calculation that takes into consideration a variety of variables when calculating the costs of converting CBD. The fixed costs in this calculation are based on conversations we had with an R&D research chemist working at a licensed facility in Colorado.



WHAT IS THE REAL COST OF CONVERTING YOUR CBD TO DELTA-8?

Based on our calculations, there's still room for Delta-8's price per kilogram to drop before the conversion becomes unprofitable. Our model suggests that, on this scale, the breakeven price per kilogram is around ~\$923.00. Based on our forecast published in last month's report, this could happen as early as May of this year. We advise our clients not to keep large inventories of Delta-8 in house due to the current Delta-8 pricing volatility.

INPUT CATEGORIES	ASSUMPTIONS
CBD quantity (kg)	10
Market value of CBD isolate	\$ 533.00
Total cost of CBD	\$ 5,330.00
Solvent quantity (Liters)	15
Total estimated solvent cost	\$ 1,400.00
Catalyst quantity (grams)	50
Total estimated catalyst cost	\$ 50.00
Total estimated labor cost*	\$ 500.00
Total analytical testing cost (QA / QC)	\$ 300.00

NOTES:

*Labor cost is estimated based on 20 hours of labor @ \$25.00/hr

**Conversion yield is calculated after conversion, work up, and purification to final product.

OUTPUT CATEGORIES	ASSUMPTIONS
Conversion yield*	85%
Delta-8 THC quantity (kg)	8.5
Market value of Delta-8 THC / kg	\$ 1,150.00
Potential Revenue	\$ 9,775.00
Estimated Profit	\$ 2,195.00

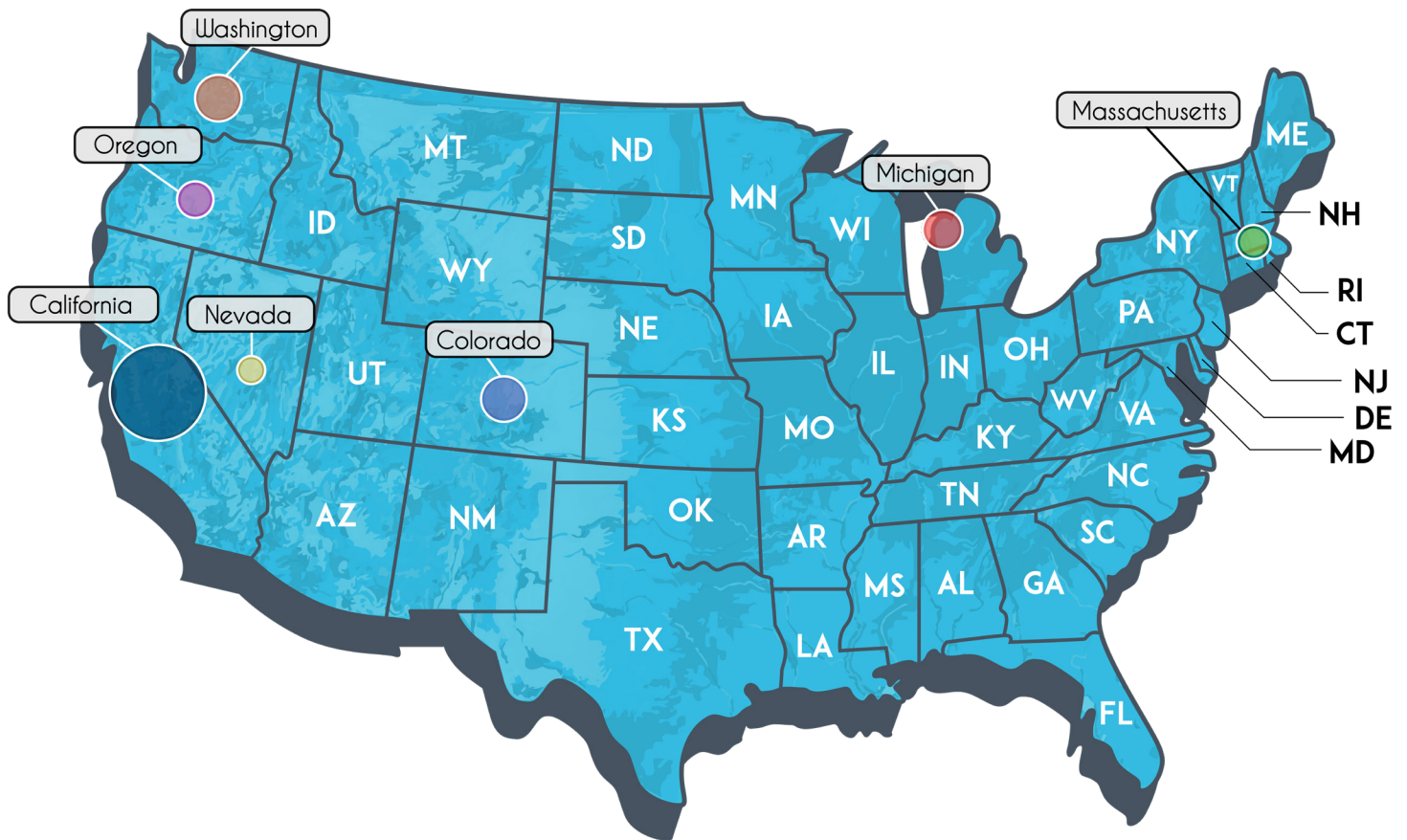
Total Input Cost = (Cost of CBD + Cost of Solvent + Cost of Catalyst + Labor + Analytical Testing)

*Potential Revenue = (Percent Yield from Reaction * Input Quantity of CBD) * Delta-8 Market Value)*

Estimated Profit = Revenue - Input Cost



MONTHLY CANNABIS REVENUE BY STATE



		● California	● Colorado	● Massachusetts	● Michigan	● Nevada	● Oregon	● Washington	TOTAL
MONTH	JAN. 2021	\$410,828,042	\$154,096,321	\$87,066,812	\$108,477,113	\$67,599,999	\$100,149,206	\$125,700,046	\$1,053,917,519
	FEB. 2021	\$389,447,487	\$143,894,789	\$81,178,712	\$103,000,000	\$63,399,998	\$88,616,325	\$116,899,999	\$986,437,310

NOTE:


The values in the table are derived from state cannabis sales and cannabis sales tax data. The image displays the relative market share for each state. Data is sourced from Headset.io a free resource for viewing publicly available adult use cannabis sales data.

California continues to outpace all other states in monthly sales but showed a slight decrease from last month's revenue to just below \$400 million.⁷ Colorado and Washington have consistently remained in 2nd and 3rd place, respectively, when comparing state sales data.

Another interesting observation from the data is the rapid rise of Michigan's market which has surpassed Oregon's adult-use market value even though Oregon is considered a more mature landscape. We contribute this to the drastic difference in population between Oregon (~4 million) and Michigan (~10 million). Michigan will be a market to keep an eye on moving forward.




SECTOR ANALYSIS*

	INDICES	3 MONTH	6 MONTH
	S&P 500	8.59%	18.26%
	DOW JONES	10.14%	17.58%
	NASDAQ	3.08%	18.72%
	GLOBAL CANNABIS INDEX	-12.48	130.14%
	AMERICAN CANNABIS STOCK INDEX	59.54%	122.64%



“Adult-use cannabis sales in Arizona reached \$2.9 million in the first 10 days that sales were permitted, according to figures released by the state. The state collected \$226,355 in tax revenue on the sales.”⁸

*This text expresses the opinion solely of the writer. The thoughts expressed are independently formed and the writer is not compensated by any third party.

	SECTOR	3 MONTH	6 MONTH
	HEALTHCARE	6.34%	8.29%
	TECHNOLOGY	8.71%	25.78%
	INDUSTRIALS	12.00%	31.57%
	FINANCIALS	20.25%	48.10%
	CONSUMER CYCLICAL	14.14%	37.44%
	CONSUMER NON-CYCLICAL	3.43%	13.87%
	BASIC MATERIALS	13.85%	34.80%
	ENERGY	24.63%	62.69%
	UTILITIES	0.87%	11.34%
	ALTERNATIVE HARVEST ETF (MJ)	55.65%	111.90%
	MULTI- STATE OPERATORS (MSOS)	30.80%	106.27%

*Information retrieved from NCV and E*trade.





BRAND SPOTLIGHT: H_{ER} HIGHNESS



Price Range:	\$15 - \$75
Target Demographic:	Women ages 25 - 40
Availability:	CBD - Nationwide / THC - California
Ownership Status:	Private

OUR RATING:



WHY WE LOVE THEM: Their gaudy luxe theme is great at drawing in lovers of kitsch.

WHY WE DOCKED STARS: The brand consistency in packaging could use some work.

Don't be afraid to do something different.

When creating your brand, it's easy to slip into the trap of thinking that, in order to express the quality of your product, you need to take a clinical approach. In reality, the exact opposite is true. Studies have shown that brand personality plays a huge role in people's purchasing decisions, and the Japanese Psychological Research journal reported that "the attractiveness of the brand personality directly affects positive word-of-mouth reports and indirectly affects brand loyalty."⁹ While we're not urging you to completely ditch your sense of professionalism, crafting a quirky brand image à la Her Highness, or conversely, creating one riddled with exclusivity (think Rolex), can help form a brand personality that lets you stand out.



Andy Warhol meets the Monte Carlo in Her Highness, a luxury cannabinoid brand that offers a variety of luxury THC and CBD goods. After seeing so many luxury cannabinoid companies offering products made for the most discerning connoisseurs, Her Highness turns this approach on its head. The unwavering dedication to queens and priestesses, alongside their delightfully gaudy gold packaging and bold red lip logo, creates an ironically pretentious brand that comforts customers rather than repels them. Gone is the stuffy, high-end cannabinoid company that houses its allure in its seriousness and formulaic approach to self-care. In its place is your good time gal, Her Highness interested in making quality cannabinoid consumption a fun process with no limits on when, how, or why.

Visit Her Highness at herhighness.com





HOT IN THE NEWS

A Illinois city uses
weed sales tax

for reparations

B CANNABIS
COMPOUND INHIBITS
SARS-COV-2
REPLICATION
IN HUMAN LUNG
CELLS

C SCHUMER WEIGHS
IN ON NEW YORK LEGAL
MARIJUANA TALKS, APPLAUDING
LEGISLATURE AND
SNUBBING CUOMO

D CANNABIS TECHNOLOGY
PLATFORM DUTCHIE RAISES
\$200 MILLION AND
ACQUIRES
GREENBITS AND LEAF LOGIX

E 4Front eyes Illinois
expansion
through \$51.5M
marijuana sale-
leaseback deal

G "The governor of Oregon on
Tuesday announced the appointment
of 17 members of a first-of-its-kind
advisory board
that will help facilitate the
implementation of a historic initiative to
legalize psilocybin mushrooms
for therapeutic
purposes."

F TOBACCO GIANT TAKES
20% STAKE IN
ORGANIGRAM
FOR C\$221 MILLION

The



of cannabinoid manufacturing

In the world of manufacturing, things move quickly. The manufacturer's goal is to manufacture their product with the target quality in the proper quantity with as little waste possible. Many manufacturing outlets will do their quality control before a process starts and after the process ends, but *what about while something is being created?*

Welcome to The *ABCs* of cannabinoid manufacturing

Provided to you by
Hellma®

CANNABIS MANUFACTURING FOR THE 21ST CENTURY

Part 5: Extraction Methods

The separation of the wide array of compounds in *Cannabis sativa* is becoming more important as regulations on cannabinoid containing products become more stringent. There are a few common methodologies used for extraction in the cannabis industry.

Depending on the intended final product, incoming processing can include separation of the flower portions with the highest concentration of cannabinoids and terpenes. Then the extraction of the terpenes and the cannabinoids can begin. Though mechanical separation methods exist, this article will focus on the most common solvent-based extractions: hydrocarbon, ethanol and super-critical CO₂. Solvent extraction methodologies have been around for millennia since the ancient Egyptians made tinctures by soaking herbs in ethanol. Tinctures are created by putting the herbs into a liquid, usually alcohol, to extract the flavors, healing components, etc.



The basic solvent extraction is based on historical methods, although we have made technological advances to help us control the processes over the centuries. Today, common organic solvents include ethanol [1], butane, and propane. [2] Water extraction will not be covered in this article due to its low yields of cannabinoids and terpenes.

Alcohol extraction uses ethanol and is one of the most common and efficient methods of extracting the cannabinoids. The initial step is to soak the raw material in Ethanol to remove the trichomes. The polar end (-OH group) of the molecule helps dissolve the hydrophilic compounds, such as chlorophyll. The non-polar end (C₂-H₅) helps to dissolve the hydrophobic compounds such as the plant waxes, oils, cannabinoids, and terpenes.

The process can be done in either warm or cold ethanol. In warm or room temperature ethanol, the cannabinoids dissolve quickly leading to a high yield of cannabinoids. However, the warm ethanol extraction process also dissolves plant lipids including the chlorophyll, which causes a strong bitter taste. By dropping the temperature of the ethanol to less than -30°C (-22°F), you decrease the solubility of all the compounds leading to a much slower dissolution of the products into the ethanol. However, it is also below the freezing point of many plant waxes which means that many of the compounds will be solids. The impurities separate from the cannabinoids and can be easily removed.

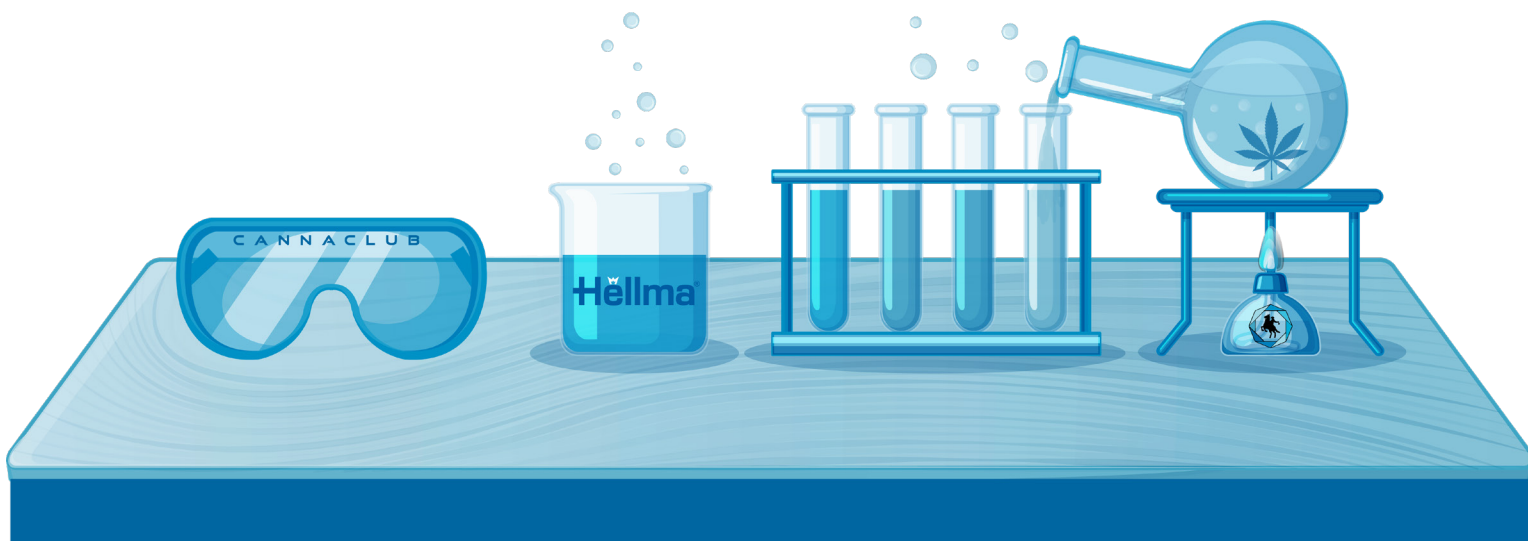


CANNABIS MANUFACTURING FOR THE 21ST CENTURY

Part 5: Extraction Methods

Hydrocarbon extraction generally uses either propane or butane. Propane and butane are small hydrocarbons, made only of carbon and hydrogen atoms, that are non-polar with low boiling points, (-44°F and 32°F, respectively) [3]. The initial extraction washes the raw material with the cold hydrocarbon.

The non-polarity of the molecules helps easily dissolve the cannabinoids, waxes, fats and lipids. Unlike ethanol, there is no polar end to help with the dissolution of certain undesired compounds such as chlorophyll. The terpenes are also easily dissolved in the hydrocarbons, though the flavonoids have limited solubility. The hydrocarbons with the products of interest can be separated by flowing the mixture into a separate area and raising the temperature. [4] With low boiling points, the hydrocarbons evaporate at -44°F (Propane) and 32°F (Butane) leaving behind the waxes, fats, lipids, cannabinoids, and terpenes.



After the separation of the hydrocarbons from the extract, the propane or butane can be recirculated through the biomass creating a closed-looped system. The result is an extract that is relatively free of inactive plant matter such as chlorophyll. Hydrocarbon extraction is losing popularity primarily due to regulations for handling propane/butane and stigma attached to using a hazardous chemical for the extraction.

The final extraction method uses super-critical CO₂. Outside the cannabinoid industry, supercritical extraction methods are used for the production of high-quality hempseed oil, extracting caffeine from coffee, removing pesticides from agriproducts, etc. [5]. At standard temperatures and pressures (room temperature and sea-level atmospheric pressure), all molecules are in their natural state of matter: solid, liquid, gas, or plasma. One can change the state of matter by changing the temperature or the pressure or both. A good example of this would be creating ice cubes in your freezer. Without changing the pressure, you can turn the water into ice by lowering the temperature.



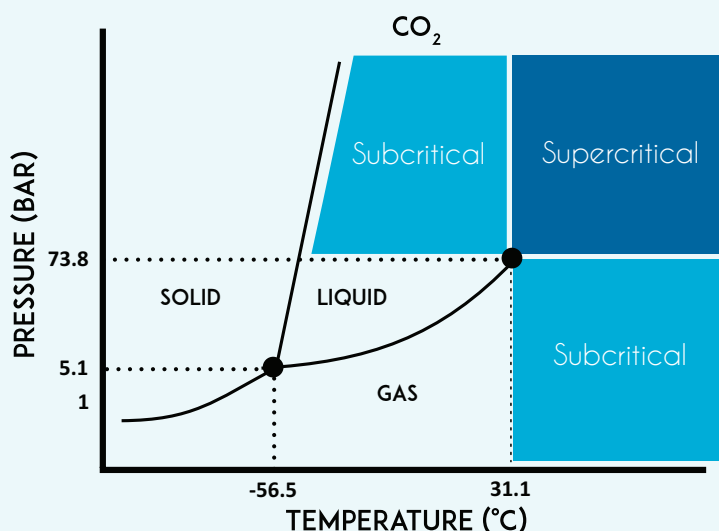
CANNABIS MANUFACTURING FOR THE 21ST CENTURY

Part 5: Extraction Methods

When modulating the temperature and pressure of a system, liquids and gases can hit a critical point where they exhibit characteristics of both liquid and gas. They take up the entire space (more compressible) like gases and have liquid-like densities. This is called a supercritical fluid. [7]. Figure 2 shows the phase diagram of Carbon Dioxide (CO_2). Using CO_2 has several advantages, it is nonflammable, non-toxic, relatively inert, abundant and inexpensive [8, 9].

FIGURE 1

EXPERIMENTAL PHASE DIAGRAM OF CO_2



NOTE:
Graphic is
modified from [6]

The other main advantage is that at a temperature of 31°C , you can maintain the supercritical liquid at 74 bar [6, 7]. The various components of cannabis have different solubilities at different temperatures and pressures, thus allowing a clean extraction of the target compounds. However, one study has shown that the concentrations of different products can be extracted at different rates, so the extract should be analyzed [2, 8, 10].

MISSED PART FOUR?

CATCH UP

Expanded versions of previous article installments are available upon request.

Hellma USA, Inc has been serving the U.S. markets in spectroscopic accessories for over 50 years. They specialize in quartz manufacturing for the lab and probes for the process. Dr. Carrier earned her Ph.D. from University of Wisconsin – Madison in Physical Chemistry specializing in Spectroscopic techniques to monitor chemical reactions.



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