

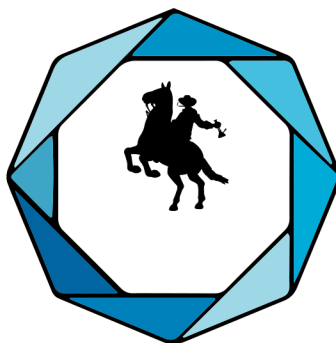


EIGHTH REVOLUTION

# Cannabinoid MONTHLY PLAYBOOK

April 2023





EIGHTH  
REVOLUTION

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# Dear Reader,

We want to thank you for your trust, and, most importantly, your time. With the endless number 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.

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 of information more helpful than others and want us to expand on the topic, please never hesitate to reach out. For any suggestions or questions, we can be reached directly at [info@8threv.com](mailto:info@8threv.com)

## Welcome to the Revolution

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### **Bryan Fields**

*Managing Director  
& Co-Founder  
Eighth Revolution*



### **Kellen Finney**

*CSO & Co-Founder  
Eighth Revolution*



## IN THIS ISSUE

# April 2023

### Market Dynamics continue to undervalue Significant Operators

**Kellen Finney, Eighth Revolution**

This April edition highlights the steady progress of the cannabis industry, which has been driven by innovation and collaboration. Even though market dynamics continue to undervalue significant operators, the ongoing legalization trend moves the industry forward. In states like New York, businesses and researchers are starting to work together to create cutting-edge products and services that cater to a diverse consumer base, laying the foundation for a stable market. This edition recognizes the measured growth and resilience of the cannabis industry, urging us to embrace opportunities and contribute to its ongoing development.

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### Turbulence on the Horizon

**Bryan Fields, Eighth Revolution**

As the cannabis industry continues to evolve and mature, there are several challenges on the horizon that could create significant turbulence for the industry. These include regulatory changes at the federal and state level, increasing competition and consolidation, and potential supply chain disruptions. Additionally, the industry is facing growing pains as it transitions from a largely unregulated market to a more tightly controlled one, which could result in increased costs and decreased profit margins. Furthermore, there is a looming oversupply of cannabis in some markets, which could lead to price drops and further market consolidation. These challenges may create significant upheaval within the industry, requiring companies to be nimble and adaptable to survive and thrive.

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***New York's Massive  
Cannabis Gray Market  
Could Cost The State \$2.6  
Billion In Lost Taxes By  
The End Of The Decade***

***-Will Yakowicz in Forbes***

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## Success = Survival. A Domino Effect is a Real Possibility.

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I'm not here to scare you, but it's time someone speaks about what can happen if we continue on this current path. In the cannabis industry, the rules feel as if they are constantly changing. While being in as many states as possible used to be the metric for success, the industry is now facing a new metric: survival. The cannabis industry faces challenges that could potentially result in the collapse of many businesses. These are established businesses and well-known operators. And no, it's not just operators that were bad managers of capital or others that couldn't build a sustainable business model. These are businesses that are sustainable and successful by usual evaluation standards but face a variable that is impossible to account for: a chain reaction of broken links.

If a chain breaks, it could have a trickle-down effect altering even the most established players who are **not** struggling. Luck is about to play a significant role in determining which companies will survive, and here's why.

The cannabis industry is a complex web of interconnected players, from growers and manufacturers to distributors and retailers. The success of any one company depends on various factors, including product market fit, successful acquisition and delivery of products and services, and, most importantly, **payment for their efforts**.

When one link in the chain breaks down, it can significantly impact the rest of the industry. For example, suppose a major distributor goes bankrupt. In that case, it could cause a ripple effect throughout the industry, resulting in manufacturers and retailers being left without a reliable source of products or compensation for their efforts. This is just a simple example to demonstrate the wider impact of one company's failure.

This is particularly concerning for many reasons. The most critical one is that this industry lacks access to capital. Access to capital is usually a safety net to handle turbulence, such as a vendor defaulting on payment. This is even more concerning for companies with viable business models and consistent revenue. These companies may have done everything right to build their business and generate profits, but if the industry chains break down, they could still be at risk of going under.

Still not convinced? Look at this headline.

According to MJBizDaily:

**"Track-and-trace software provider Metrc is threatening to shut down the accounts of more than 100 Michigan cannabis companies over missed monthly payments, creating turmoil in the roughly \$2 billion market."**

This is just the tip of the iceberg. Let's break down this example further. (By the way, our episode with Michael Johnson, CEO of Metrc, is live, and it's a great one, so go check it out. Now, back to our example.) Operators decide to not pay Metrc. Metrc shuts off access. Companies can't sell products. Metrc can't afford to operate its track-and-trace software. Other companies that are not involved in this immediate issue experience a trickle-down effect, being hurt or disrupted by these efforts. This is just one example of a massive problem that is brewing and will, unfortunately, erupt somewhere.

Silicon Valley Bank is a potential example. For those who are unfamiliar with this, it's worth a quick Google search to understand the implications of how when one company makes a mistake or has an issue, several others in the chain are affected. Causalities are an unfortunate reality, and no, it's not just related to the tech and start-up industry.

## Success = Survival. A Domino Effect is a Real Possibility.

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One of the biggest challenges facing the cannabis industry is financial. Due to the federal prohibition of cannabis, many banks are reluctant to work with cannabis companies. This makes it difficult for companies to secure loans and investments, resulting in high fees and limited access to financial services.

The industry, money-wise, is broken, with many companies struggling to generate consistent revenue and maintain profitability. This is partly due to the earliness of the market, the unique legal status of cannabis, and banking issues. The variability and fluctuations, as we have seen in the pricing of cannabis, lead to countless unknowns. Today, you can sell your product with a margin. Tomorrow, you may need to sell it at a loss. How do companies make sound financial decisions when the most critical aspects of their business are fluctuating and unknown?

In a highly competitive market, companies must make strategic choices about everything from product offerings to distribution channels to which vendors they have to pay first. These decisions, while self-serving, have an ongoing ripple effect on the chain. Smaller operators in the cannabis industry are particularly vulnerable to these challenges. They often need resources to make payroll, and without financial backing, it may make it difficult for them to survive any speed bumps.

The state of the cannabis industry is concerning, with many companies facing financial challenges and uncertainty. Even the most well-off companies are potentially at risk of a domino effect. Survival depends on preserving capital and overcoming the challenges the industry chains face.

The impact of industry chain failures can be felt at every level of the industry.

Growers who have invested heavily in their crops may not get paid for their crops.

Manufacturers who have built a successful brand could be left without payment for their products.

Retailers who have established a loyal customer base could be left with less product on their shelves.

The cannabis industry is unfair, and luck plays a significant role in determining which companies will survive. As the industry continues evolving, companies must remain agile and be prepared for potential industry chain failures. "Success" is now "survival."





**The Dime**    Listen Now

A weekly podcast covering the entire Cannabis Industry.

## RIP Hangovers: The Cannabis Beverage Taking on Alcohol

On consumers switching from alcohol to cannabis beverages

The need for an alcohol substitute that gives you a little buzz and doesn't make you hungover? That's a universal need, and it extends far beyond traditional cannabis consumption patterns. It's for people who have never consumed cannabis before; it's a great way for somebody to try cannabis for the first time and not have a bad time.

The misnomer of total cannabis beverage market size

Cannabis industry pundits often think about the universe as people buying cannabis from dispensaries today, and if you're looking at the data, yeah, 50% of the drinks being sold on a dollar basis [...] are 100mg THC shots. I think it's because we're early. The people walking the dispensary floor are much more likely to need 100mg of THC at an approachable price point.

But, we have always looked at the universe as just like people on the earth, and we're trying to figure out if you stop ten people on the street in New York City, and you said, "Do you wanna drink less booze?" Eight out of ten would say yes. And if you stopped the same ten people on the street, or you asked them a follow-up question and said, "Are you a cannabis user?" More than 50% of them would say no.

Separating low-dose and high-dose products

Cannabis needs to have a split where the lower dosage products that are not as dangerous are more broadly accessible. Unfortunately, the first wave of that split was CBD versus THC. But that's like saying LaCroix and Whiteclaw are like two sides of the same coin; like, one has booze, one does not. [...] It's not about the absence or presence of THC that makes something safe—it's the potency.



**Luke Anderson, Co-Founder at Cann**

So, I think potency-based regulations [...] like what we're seeing with the Delta-9 stuff in Minnesota, Texas, New York—I think that should be just like a sweeping national regulation, and it shouldn't be limited to deriving from hemp.

It should be based on the scientific architecture of the product.

\*\*\* The following transcript is AI-generated and some words have been removed for spacing. Please listen to the episode for full context.





# The Dime



 Listen Now

A weekly podcast covering the entire Cannabis Industry.

## The Cornerstone of Cannabis Regulations

### Scaling Metrc with the needs of the industry

There's been a lot of time, a lot of effort, [and] a lot of money over many years trying to harden the backend so that we can handle different things.

To give you some perspective, we have many integrators, but there's one that I was just talking to yesterday, and that's why it's [at the] top of [my] mind that passes 100 or 1.5 million calls every single day, which means that you're [part] of that [...] connection into the system, passing information or pulling information out every single day, so you can't just build a system, like a simple app, [that] handles something like that.

It's very difficult once you start to scale something, especially once you get past a certain size because there are just not that many software programs out there. And the way something has to be built to handle that volume and 360,000 people plugging away at it every single day is very different from maybe a typical app or something you might use on a day-in and day-out basis.

### Importance of a federal standard

If you have a standard that pulls kind of everything together and takes this noise and distills it into the standard that's common across the states, then you get into a situation where everybody's speaking the same language, everybody's compliant in the same kind of way.

You really open the door to that kind of holy grail. At least, many states in the west are [addressing] interstate commerce, and even further beyond that, as you pay attention to what's happening, being able to export from the United States into Europe will be massive for the industry [as well].

And the best way to do that is to create a standard. So, I would say that [...] when you rely on those annoyances of compliance to be able to really grow your business [in] a way that you otherwise didn't have the opportunity [to], then it feels a lot more desired than required.



**Michael Johnson, CEO of Metrc**

### Areas Metrc can help others in that most don't see

It takes less than four seconds to go through an entire process from [the] manual process of weighing a plant if you're using the RFID-enabled, and if I have a room of a hundred plants, they're just not all going to end up yielding the same amount.

For many growers, getting ten more grams per plant would be, could be the difference between bankruptcy and being widely successful. That level of visibility and that data exists. It's there. It's passively collected. It's cheap. You already have the most expensive part with the inlay and the tag.

If you had a similar RFID tag that wasn't a Metrc tag but had similar specifications, you would pay three times as much in the market. You have this amazing opportunity to get this information, to be very successful, and to be at the cutting edge of efficiency as it relates to your operation.



\*\*\* The following transcript is AI-generated and some words have been removed for spacing. Please listen to the episode for full context.



# INTERNATIONAL UPDATE

## Argentina

Argentina makes headway in establishing a cannabis export industry

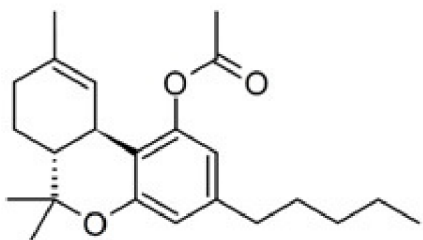
## Germany

Germany Will Move Forward With Marijuana Legalization After Receiving 'Very Good Feedback' From EU, Top Official Says

## Morocco

Morocco opens first lab for cannabis use in industry, medicine

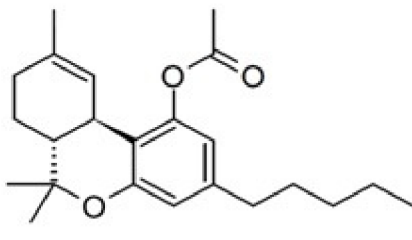
## Minor Cannabinoid Wholesale Pricing



Industry Name: THC-OAcetate

CAS Number: 23132-17-4

IUPAC: (6aR,10aR)-6,6,9-trimethyl-3-pentyl-6a,7,8,10a-tetrahydro-6H-benzo[c]chromen-1-yl acetate

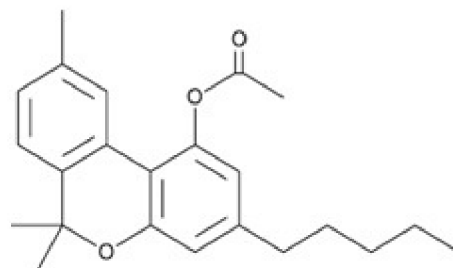


Industry Name: HHC Acetate

CAS Number: 6692-85-9 (racemic)

946512-74-9 (6aR,10aR)

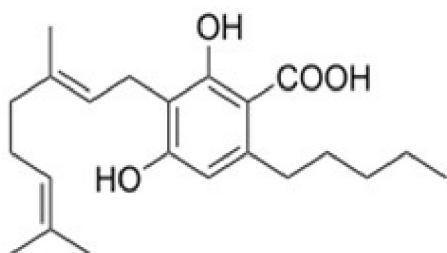
IUPAC: (6aR,10aR)-6,6,9-trimethyl-3-pentyl-6a,7,8,9,10,10a-hexahydrobenzo[c]chromen-1-ol



Industry Name: CBN-O Acetate

CAS Number: 51895-51-3

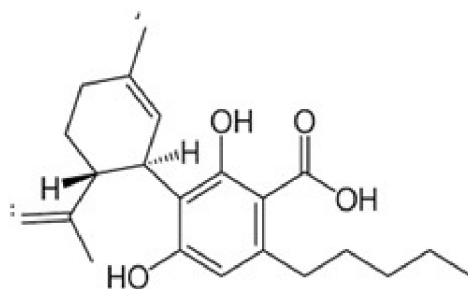
IUPAC: 6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol, 1-acetate



Industry Name: CBGA

CAS Number: 25555-57-1

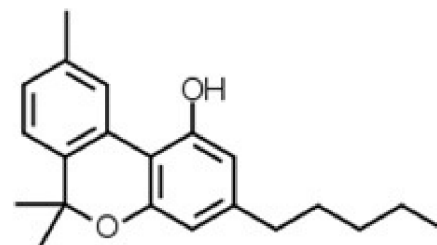
IUPAC: 3-[(2E)-3,7-Dimethylocta-2,6-dien-1-yl]-2,4-dihydroxy-6-pentylbenzoic acid



Industry Name: CBDA

CAS Number: 1244-58-2

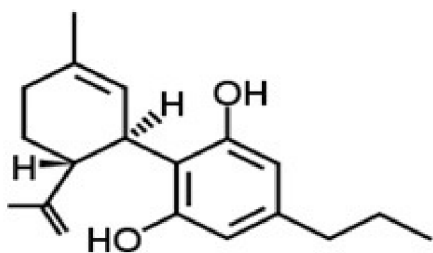
IUPAC: 2,4-dihydroxy-3-[(1R,6R)-3-methyl-6-(1-methylethenyl)-2-cyclohexen-1-yl]-6-pentyl-benzoic acid



Industry Name: CBN

CAS Number: 521-35-7

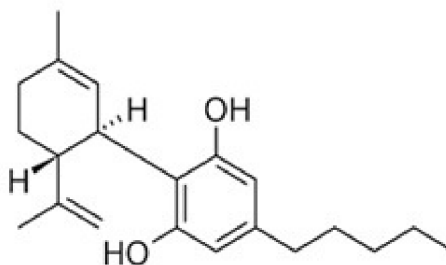
IUPAC: 6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol



Industry Name: CBDV

CAS Number: 24274-48-4

IUPAC: 2-[(1R,6R)-3-methyl-6-(1-methylethenyl)-2-cyclohexen-1-yl]-5-propyl-1,3-benzenediol

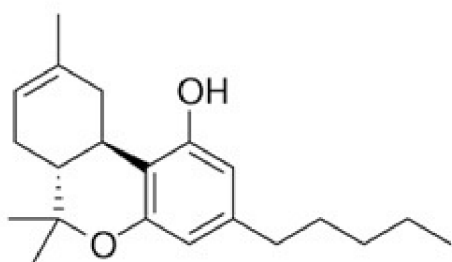


Industry Name: CBD

CAS Number: 13956-29-1

IUPAC: 2-[1R-3-methyl-6R-(1-methylethenyl)-2-cyclohexen-1-yl]-5-pentyl-1,3-benzenediol

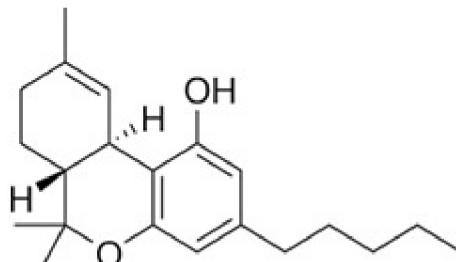
## Minor Cannabinoid Wholesale Pricing



Industry Name: Δ8-THC

CAS Number: 5957-75-5

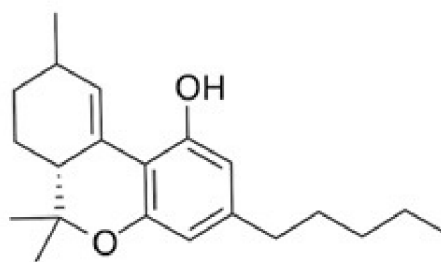
IUPAC: 6aR,7,10,10aR-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol



Industry Name: Δ9-THC

CAS Number: 1972-08-3

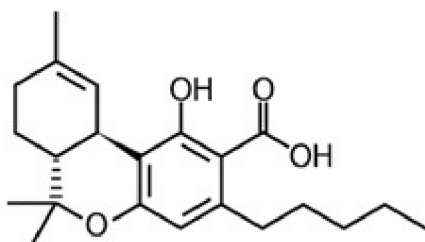
IUPAC: 6aR,7,8,10aR-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol



Industry Name: Δ10-THC

CAS Number: (6aR, 9S) 95588-87-7

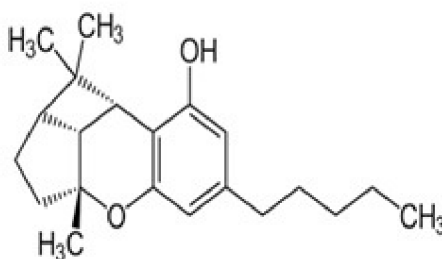
IUPAC: (6aR-trans)-6a,7,8,9-tetrahydro-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-1-ol



Industry Name: THCA

CAS Number: 23978-85-0

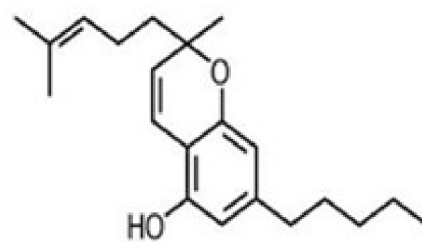
IUPAC: 6aR,7,8,10aR-tetrahydro-1-hydroxy-6,6,9-trimethyl-3-pentyl-6H-dibenzo[b,d]pyran-2-carboxylic acid



Industry Name: CBL

CAS Number: 21366-63-2

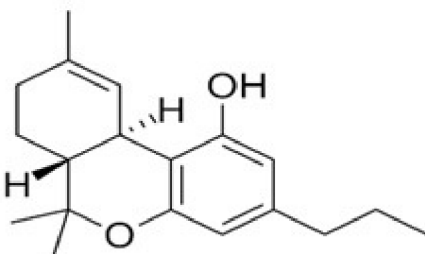
IUPAC: (1aS,1a1R,3aR,8bR)-1,1,3a-trimethyl-6-pentyl-1a,1a1,2,3,3a,8b-hexahydro-1H-4-oxabenzof[f]cyclobuta[cd]inden-8-ol



Industry Name: CBC

CAS Number: 20675-51-8

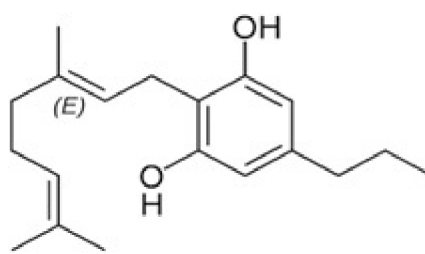
IUPAC: 2-methyl-2-(4-methyl-3-penten-1-yl)-7-pentyl-2H-1-benzopyran-5-ol



Industry Name: THCV

CAS Number: 31262-37-0

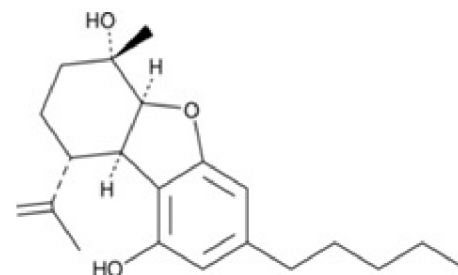
IUPAC: 6aR,7,8,10aR-tetrahydro-6,6,9-trimethyl-3-propyl-6H-dibenzo[b,d]pyran-1-ol



Industry Name: CBGV

CAS Number: 558224-11-8

IUPAC: 2-[(2E)-3,7-dimethyl-2,6-octadien-1-yl]-5-propyl-1,3-benzenediol

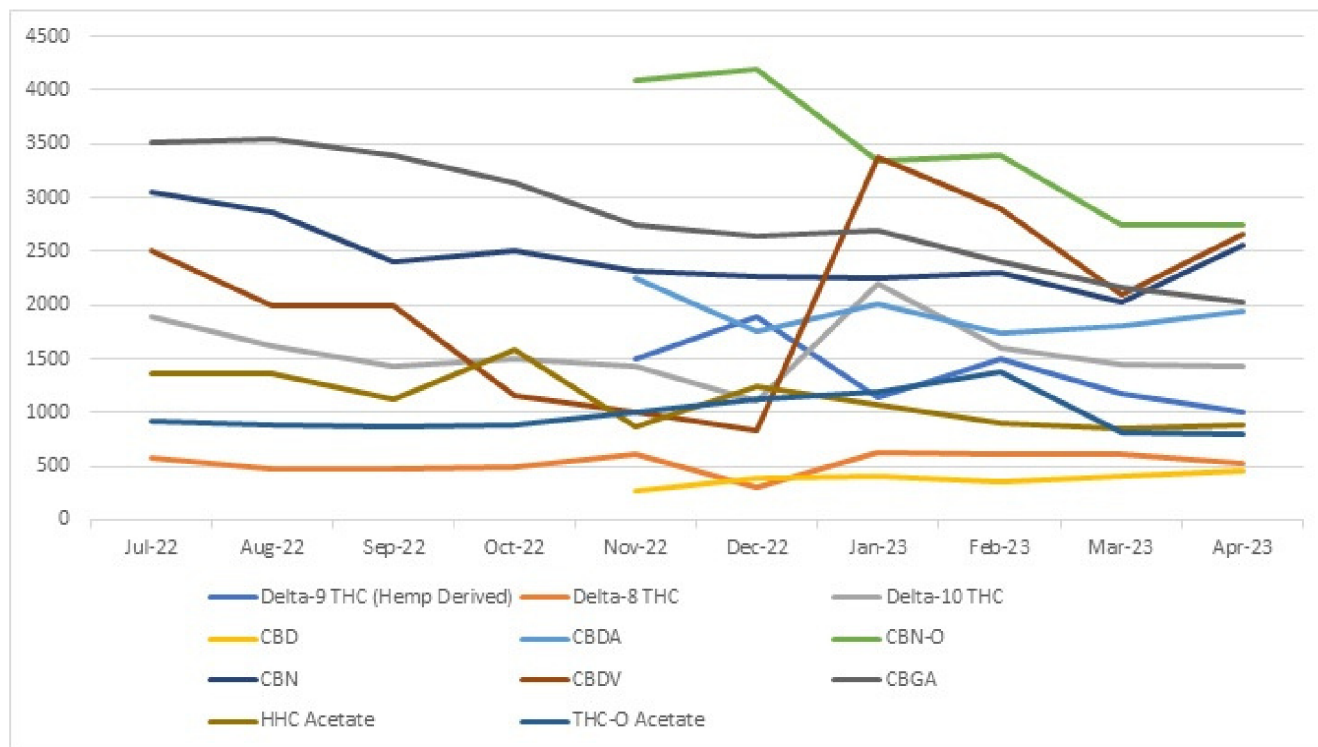


Industry Name: CBE

CAS Number: 52025-76-0

IUPAC: (5aS,6S,9R,9aR)-5a,6,7,8,9,9a-hexahydro-6-methyl-9-(1-methylethenyl)-3-pentyl-1,6-dibenzofurandiol

## Minor Cannabinoid Wholesale Pricing



Our observations of the wholesale cannabinoid market in the U.S. region demonstrate a mixed trend in pricing across different months. This analysis focuses on the monthly percent change in the wholesale pricing data from January 2022 to April 2023. Delta-9 THC (Hemp Derived) Distillate witnessed a decline of 15% in pricing from February to March 2023, dropping from \$1,900.00 to \$1,150.00 per kilogram. Delta-8 THC Distillate also experienced a 15% decrease in pricing, moving from \$617.86 to \$525.00 per kilogram. Delta-10 THC Distillate saw a marginal decline of 1% in pricing from February to March 2023, decreasing from \$1,450.00 to \$1,433.33 per kilogram. CBD Isolate experienced a 15% increase in price, rising from \$356.00 to \$461.67 per kilogram. CBDA Isolate demonstrated an 8% increase in pricing, moving from \$1,733.33 to \$1,950.00 per kilogram. CBN-O Distillate pricing remained stable at \$2,750.00 per kilogram. CBN Isolate witnessed a 26% increase in pricing, moving from \$2,025.00 to \$2,560.00 per kilogram. CBDV Distillate had a 27% increase in pricing, from \$2,100.00 to \$2,666.67 per kilogram. CBGA Isolate experienced a 6% decline in pricing, decreasing from \$2,162.50 to \$2,025.00 per kilogram. HHC Acetate Distillate observed a 4% price increase, from \$849.60 to \$882.67 per kilogram. Lastly, THC-O Acetate Distillate saw a 2% decline in pricing, decreasing from \$815.00 to \$800.00 per kilogram.

The wholesale pricing data for various cannabinoids in the U.S. region from January 2022 to April 2023 displayed diverse trends. While some products experienced price increases (CBD Isolate, CBDA Isolate, CBN Isolate, and CBDV Distillate), others witnessed price decreases (Delta-9 THC Distillate, Delta-8 THC Distillate, Delta-10 THC Distillate, and CBGA Isolate), and a few remained stable (CBN-O Distillate). When analyzing these pricing trends, it is essential to consider multiple factors, including market demand, regulatory changes, and production costs. The data reveals that the market for cannabinoids is in constant flux, making it essential for businesses to keep a close eye on industry trends and adjust their strategies accordingly.

**\*Disclaimer** some of the text from this analysis was generated with an AI system.

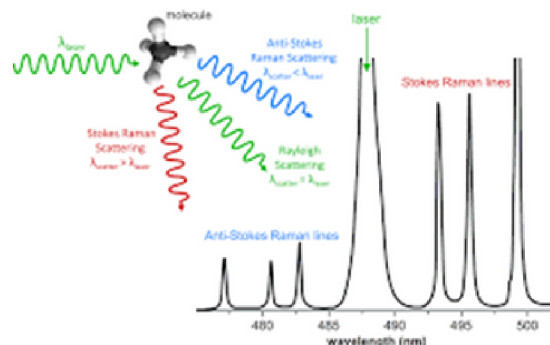


## Systematic Approach to the Smart Factory

In this month's playbook, we expand on the application of Process Analytical Technology (PAT) in the cannabis product formulation industry. We will delve deeper into advanced PAT applications that optimize the manufacturing process for vape pens, terpene purification, and edible dose monitoring. We will also explore the potential benefits of integrating PAT with data analytics and automation technologies to enhance process efficiency and product consistency.

### Advanced Vape Pen Formulation

To further optimize the vape pen formulation process, incorporating Raman spectroscopy can provide valuable information on the molecular structure of the cannabis extract, carrier oil, and terpenes. This additional data enables manufacturers to fine-tune the formulation for optimal viscosity, stability, and bioavailability. Additionally, integrating PAT data with advanced process control (APC) software allows for real-time, automated adjustments during the formulation process, ensuring a more accurate and consistent final product.

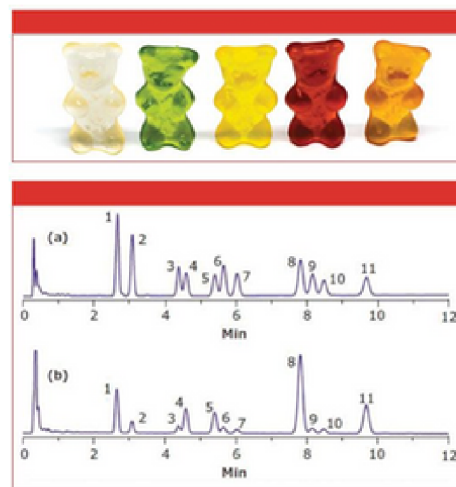


### Enhanced Terpene Purification

In addition to the PAT technologies mentioned last month, supercritical fluid chromatography (SFC) can be employed to further optimize terpene purification. SFC provides superior selectivity and efficiency in separating terpenes, enabling the isolation of target compounds with minimal degradation. Coupling SFC with mass spectrometry (MS) allows for real-time terpene purity and concentration analysis, providing valuable feedback for process optimization.

### Advanced Edible Dose Monitoring

High-performance liquid chromatography (HPLC) can be integrated into the manufacturing process to further enhance edible dose monitoring. HPLC provides a more precise quantification of cannabinoids in the final product, ensuring a consistent dose. Combining HPLC data with advanced statistical process control (SPC) software allows manufacturers to identify and correct any deviations in the manufacturing process.



## Spain points the way on cannabis consumption clubs

By Marc Brandl

For all our grumbling about the US cannabis market, Spain has little to recommend itself at this point in time. Spain grows a lot of cannabis, over 23k kilos last year, with a similar number expected this year. However, 81% is destined for export with the remainder used for research or production of two pharmaceutical products approved for prescription.

Access to medical cannabis for Spanish patients is currently severely limited. That will change soon. The Spanish health authorities are two months late in approving the regulatory framework requested by the Health Commission of the Congress for setting up regulated medical access to cannabis for its citizens. The regulations are expected soon and would begin life as a stricter version of Germany's medical cannabis program. Legal recreational cannabis seems far off after being voted down in the Spanish parliament's major parties. The status of consumable CBD and seed sales also unclear although readily available in stores and online.

But one shining diamond in the rough where Spain currently outpaces the US can be found in their non-profit cannabis clubs' model. After attending ICBC's business conference and the three-day cannabis consumer festival 'Spannabis' myself and colleagues would head to downtown Barcelona for amazing food on a terrace and a trip to one of the hundreds of cannabis clubs located in the iconic city. The clubs are structured as non-profit social and recreational organizations. Only members can enter and purchase and consume cannabis. The clubs have the support of the local government but not the federal government. Clubs remain in a legal grey zone even as they grow in popularity in cities like Barcelona and Valencia and tourism destinations like Ibiza.

At Choko in downtown Barcelona I prefilled my membership online the day before. When I arrived was verified, paid my annual membership fee of ~\$40 and given a membership card that I could add money on to spend inside the club all items for sale. Within the club you could buy alcohol, drinks, snacks and cannabis. God forbid, you could even get pre-rolls with 25% tobacco mixed in. The environment was dark and intimate. Tasteful local art was showcased on the wall. A live DJ mixed a tribal house set at a volume where you could still talk to the people near you.





## Spain points the way on cannabis consumption clubs

By Marc Brandl

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The sitting encouraged interaction with others at large tables and circular shaped clusters of couches and comfy chairs. The prices for cannabis and everything else was ultra-affordable. The cannabis counter featured a selection of 12 types of quality flower as well as some limited selections of hash, concentrates and vape cartridges. The pace was relaxed, there was no pressure to keep spending money, the setting was hip but not overdone.


Why is the US cannabis consumption lounge so far from this excellent model? The primary factor is the supremacy of grey market operators, unimpeded by laws and regulations, who can set up a premise that understands and meets its club member's desire. Mixing alcohol and cannabis? No problem. Tobacco mixed into pre-rolls? Why not? Reasonable prices with no pressure to keep buying products? Yes, no problem.

At the beginning of adult rec. cannabis markets like Colorado and Washington coming online myself and many others thought that social consumption lounges would be one of the easier problems to solve. Mix using and buying cannabis with food, beer and wine, community, and a nice vibe to relax. Sure, tobacco is never going to be disallowed in the US and there would be restrictions: zoning, limits on amount of alcohol (beer and wine only) and cannabis sold. But as they say, it's not rocket science. Lounges remain for the most part illegal, controversial or sterile where they do exist and have yet to catch on in popularity.

We see the same dynamic in place in New York City right now with illegal dispensaries providing what consumers want at a reasonable price. If any city will lead the way on consumption lounges in the US it will be Las Vegas. A city always in tune with providing what tourists and consumers want with profit in mind will see the first lounges open later this year.

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## SECTOR ANALYSIS\*

	INDICES	3 MONTH%	6 MONTH %
	S&P 500	-4.09%	12.60%
	DOW JONES	-3.90%	2.73%
	NASDAQ	7.63%	2.46%
	GLOBAL CANNABIS	-18.78%	-33.26%
	AMERICAN CANNABIS	-20.63%	-35.75%



**"Scale is not the ultimate driver of cannabis companies".  
Rob Sehrst on The Cannabis Investing Podcast**

\*This text expresses the sole opinion 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	0.3%	20.58%
	TECHNOLOGY SECTOR	3.36%	2.17%
	INDUSTRIALS	-1.55%	5.56%
	FINANCIALS	-5.68%	-3.11%
	CONSUMER CYCLICAL	1.12%	-5.75%
	CONSUMER NON-CYCLICAL	-4.1%	4.45%
	BASIC	-3.64%	10.22%
	ENERGY	-7.92%	-4.75%
	UTILITIES	-6.93%	-10.61%
	ALTERNATIVE HARVEST ETF (MJ)	-26.23%	-33.82%
	MULTI-STATE OPERATORS (MSOS)	-31.00%	-42.23%

\*Information retrieved from NCV and E\*trade.

## Challenges, Opportunities, and Future of Cannabis Research

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The use of cannabis and cannabis-derived molecules for medicinal purposes has occurred for Millennia. The incorporation of cannabis into Western medicine has occurred relatively recently as the result of the identification of cannabinoid receptors and the elucidation of the endocannabinoid system.<sup>1-3</sup> An ever-expanding list of bioactive molecules derived from cannabis has been established including both major and minor cannabinoids, terpenes, and flavonoids.<sup>4,5</sup> Ultimately these scientific efforts resulted in Food and Drug Administration (FDA) approval for the use of synthetic cannabinoids for several medical conditions,<sup>6</sup> and the approval of cannabis-derived cannabidiol (CBD) for select forms of epilepsy.<sup>7</sup>

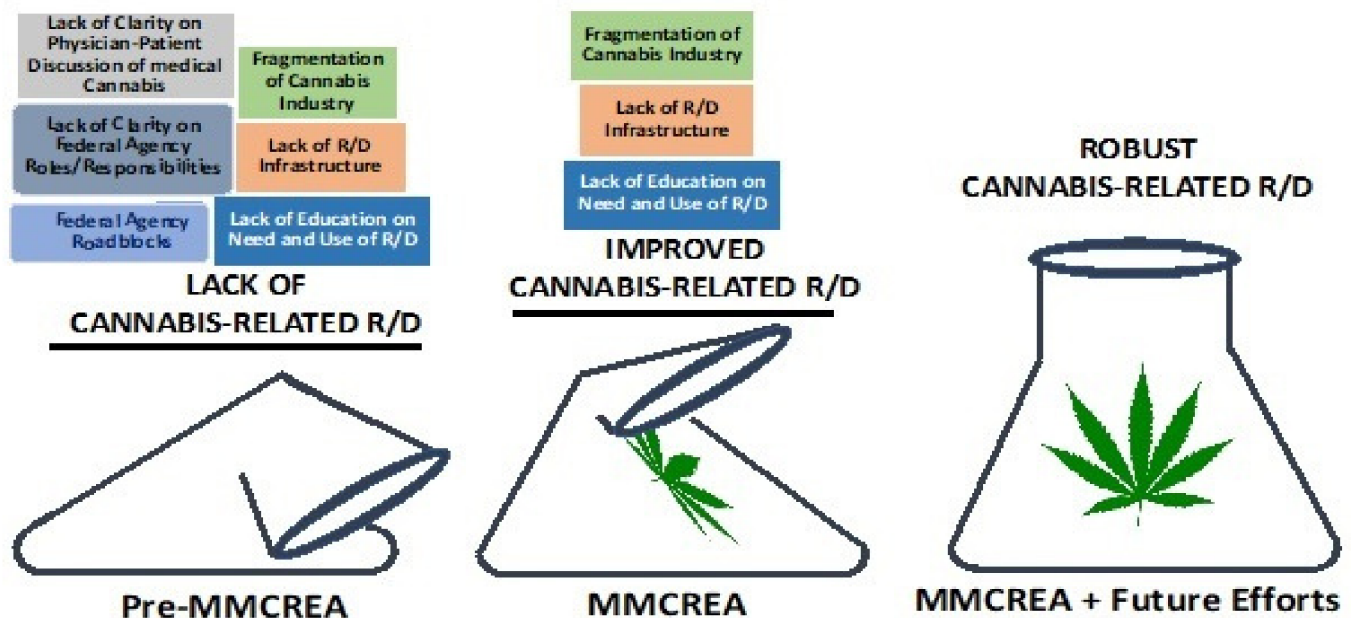
Despite the considerable advances made in the research and development (R/D) of cannabis-based therapies, the reality is that our understanding of the therapeutic potential of cannabis-based molecules lags far behind what is known for many other botanicals.<sup>8,9</sup> Longstanding impediments to the R/D of cannabis-based therapies include:

- Legacy of Federal agency roadblocks
- Lack of clarity on Federal agency roles/responsibilities
- Lack of guidance on the legality of physician-patient discussions of medical cannabis use
- Lack of R/D infrastructure
- Lack of rigor in regard to the quality/amount of cannabinoids in commercially available products
- Lack of education on the need and utility of research
- Fragmentation of the cannabis industry

In December of 2022, the president of the United States signed into law the medical marijuana and cannabidiol research expansion act (MMCREA).<sup>10</sup> The MMCREA directly addresses several of the obstacles that have slowed the pace of cannabis research. In particular, the MMCREA removes and streamlines several longstanding regulatory hurdles to cannabis-related research and provides support for physician-patient conversations on the topic of medical cannabis. In addition, the MMCREA requires federal agencies to report annually to Congress on the efforts that have been taken to ensure an adequate supply of research-grade cannabis and to report on the latest health benefits/risks of medical cannabis.

## Challenges, Opportunities, and Future of Cannabis Research

Taken together, the MMCREA unequivocally improves multiple aspects of the research environment surrounding medical cannabis R/D (Figure 1). However, it is important to point out that several key obstacles to cannabis-related R/D remain largely intact and unaffected by the MMCREA (Figure 1). Moving to a state of robust cannabis-related R/D will require addressing the fragmentation, lack of infrastructure, and lack of education that currently impede the creation of a robust cannabis R/D environment.



*Figure 1. The medical marijuana and cannabidiol research expansion act (MMCREA) improves many, but not the majority, of obstacles that have impeded cannabis-related R/D.*

*To be continued, next month.*

## Part 2: How to Leverage the Success of MMCREA Moving Forward

# HOT IN THE NEWS

April 2023

- 1** **Former Top Minnesota Lawmaker Launches Cannabis-Infused Drink Company**
- 2** **Missouri paces to be the fastest state to reach \$1B in cannabis sales**
- 3** **16 Bipartisan Congress Members Urge Biden Administration To Make Cannabis Scheduling Review Transparent**
- 4** **Delta-8 Is Legal And The United Nations Is Dead Wrong About Cannabis**
- 5** **UN Suggests U.S. Federal Government Must Force States To Repeal Marijuana Legalization To Comply With International Treaty**
- 6** **Marijuana MSO TerrAscend applies to list shares on Toronto Stock Exchange**
- 7** **Minnesota Senators Approve Major Overhaul Of Marijuana Legalization Bill, With House Previewing Similar Move**
- 8** **Hawaii Marijuana Legalization And Psychedelics Research Bills Advance To Senate Floor Votes Following Committee Approval**



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