

FEATURING  
Ken White  
Cura Cannabis Solutions

# Extraction Scientists: TRANSFORMING EXTRACTION FROM TRENDFORMATION TO FACTUAL DATA

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As we all know, there has been a big rise in recent months and years in our knowledge of how terpenes influence and complete cannabinoid profiles. These cannabinoid profiles, thought to be responsible for the characteristic physiological traits of *C. indica* and *C. sativa* varieties, are also responsible for the so-called “entourage effect.” The entourage effect states that in order to experience the full range of cannabis psychoactivity, additional compounds

besides THC, “their entourage,” are required. However, without the funding necessary to conduct large-scale scientific studies on the matter, we are left mostly to hearsay arguments on the subject. Joining us to discuss this topic is Ken White, VP of Technology and Manufacturing from Cura Cannabis Solutions in Oregon.

## The Terpene Factor

Even though a sweeping, comprehensive scien-



tific study on the topic has been elusive so far, Ken points to “several studies that have demonstrated the effects of these terpene components absent of their cannabinoid counterparts.” Specifically, Ken brings to mind several common terpenes found in every cannabis cultivar, like D-Limonene, Beta-Myrcene, and Beta-Caryophyllene. These common terpenes have been shown to produce physiological, therapeutic effects on their own, independent of the presence of cannabinoids. Ken feels very confident in saying that terpenes “play a significant role in the entourage effect...based upon scientific data supporting the physiological activity of terpenes as well as anecdotal data from cannabis consumers.”

### **Changing With the Times**

Having left the mainstream chemical industry to work with cannabis in 2015, Ken has been involved with extractions since he first started working in cannabis. We were interested in learning what changes he has observed in the industry over the past three years and what led him to become interested specifically in distillates at this time. Ken points out that when he joined the industry, “the dominant volume of product development was being conducted by untrained individuals.” This resulted in a massive influx of “mostly incorrect anecdotal trend information,” a term which Ken simplifies to “Trendformation.” In other words, wrong data was being propagated from one individual to the next, one company to the next, without any checks or balances. With no proper scientific basis for their methods or utilities, trendformation was passed on as factual data. Generations of wrong data have brought the industry to a place where scientific study is desperately needed in every aspect of the manufacturing and refining process.


Correlated with the propagation of trendformation was the rising tide of hydrocarbon extractions. When he joined the industry, supercritical CO<sub>2</sub> was the most common method for extracting cannabinoids and terpenes from cannabis, with hydrocarbon systems just being explored on an individual basis. “I cut my teeth in the industry with hydrocar-

bon extractions,” Ken says. “CO<sub>2</sub> has its place, but the quality of hydrocarbon extraction, as a one-step process, has yet to be matched to date.” Ken was impressed from his earliest days by the speed with which these systems evolved, by meticulous testing and research, by individuals “with little more than a high school education.” The evolution of these systems from “open blasting cans of liquid butane into a Pyrex pan” into “a simple yet extremely efficient closed-loop active/passive hydrocarbon, capable of processing 40+lbs. of cannabis plant material per batch” was astounding.

Cannabis extracts, especially when coming from hydrocarbon extraction systems, can possess an incredibly potent and flavorful profile of cannabinoids and terpenes. The proliferation of these extracts came in tandem with the popularization of portable vaporizer cartridges. The vape carts allowed consumers to have easy, safe access to these high-quality extracts. One of the initial challenges facing these systems was that the extracts produced were too pure; their product, when left on the shelf, would begin crystallizing. “The THCA (crystalline) content in most well-made hydrocarbon extracts doesn’t function well in a vape cartridge.” To solve this problem, cannabis manufacturers began mixing terpenes directly into the cannabis oil. The terpenes came from a variety of natural and synthetic sources. This essentially led to a “rapid mass adoption of cannabinoid distillates infused with cannabis-derived terpenes.” The result of combining these two markets, two products, was “a high-potency, homogenous cannabis oil that functions very well both in vaporizer cartridges and dab rigs.” Ken especially points out how the pleasant flavor and aroma of naturally-derived cannabis terpenes adds unique properties to the original product not present before, which improved its overall acceptance by the market.

### **Beginning to End: Extraction’s Most Complex Part**

When asked what the most complex part about the extraction process was to him, Ken points out that there is more than one way to extract canna-



binoids and terpenes from cannabis plant matter. He believes that “each process has its own bottleneck.” CO2 extractions, while environmentally friendly, are slow and require significant time for winterization and filtration in order to remove the lipids that are concentrated in the extract during the extraction process. Hydrocarbon extractions, although they successfully capture greater percentages and perhaps amounts of cannabinoids and terpenes in the original sample, have a “limited mass loading,” and require a dewaxing/winterization step as well. Ethanol extractions are saved from dewaxing or winterizing, since ethanol does not liquify the plants lipids or waxes, but “do present the challenge of larger volumes of solvent to recover.” Ken points out that regardless of how cannabis is processed, the greatest challenge is coordinating the many steps required for the extraction process as a whole to produce the end product. It is the successful coordination of these steps itself that is the most complex part of cannabinoid extractions.

### **The Testing Process**

The California testing marketplace is very different than the one in Oregon. With such a large volume of product in circulation, the regulatory challenges of successfully testing each product have been pointed out repeatedly in the past. This is especially true when parables have been construed comparing the California marketplace to other legal markets that have preceded it, such as Colorado, Washington, and Oregon, and since testing labs are slow to be approved, and may require constant supervision to be successful Ken does not see this as an issue. He is confident that California’s experience will be similar to that of Oregon. Soon, Ken says, “California will begin to enforce testing standards for residual solvents and pesticides. The bulk material that is clean will be made into final products and contaminated materials will be remediated into usable product free of pesticides.” Like Oregon, this process will separate the companies that operate illegally, or with sub-par manufacturing standards, from those that continue to attempt to operate within the confines of the prescribed legal limits.


Ken pointed to the great efforts undertaken by his own company, Cura, to ensure that their products are free of solvents and pesticides. Cura accomplishes this task by “selecting samples from every batch of cannabis we intend to process and perform a small-scale extraction on that material to ensure that even in the concentrated form, there are no pesticides present.” This ensures that the products Cura puts on the market are free of any pesticides at even their most concentrated and purest form.

### **Challenges in Oregon**

Companies operating in Oregon have had a longer period of time to adjust their manufacturing practices to ensure compliance to regulatory standards within the state. However, the regulations themselves are organic, and continue to evolve and change with the marketplace as time goes by and more information comes out. When asked about the biggest regulatory hurdle Cura has encountered in Oregon, Ken says it is dealing with changes that occur during times of explosive market growth. “The difficulty lies,” he states, “in changes within legislation during rapid growth periods like those currently seen in the cannabis industry.” Even so, Cura strongly believes regulation is necessary to develop the legal cannabis market, and those regulations must be strictly adhered to. “We have an entire team of awesome people dedicated to ensuring that all operations are compliant. We test out products at every stage of production to ensure that not only are we compliant, but most importantly, that we are providing our customers with the highest quality products possible.”

### **Quality Control**

One of the greatest challenges facing the once-unregulated cannabis industry is the transition of its manufacturing practices to GMP standards. Switching to GMP standards is one of the most crucial aspects of regulating the cannabis market because it is the cornerstone of ensuring consumer safety. Ken believes that the key to make this transition successful is the development of “robust and reproducible standard operating procedures (SOPs).” SOPs



ensure both high-quality extracts and enforcement of the strongest possible levels of consumer safety. This is because when highly-trained individuals follow SOPs, there can be reductions in human error.

### **Scaling Up**

Until recently, most cannabis businesses started small and slowly scaled up with time. Ken noted that his company “operates on an ever-increasing scale.” This scaling-up is necessary in order to continue to provide their growing customer base with the best possible extracts at the most affordable price. Scalability, Ken says, is different with every process. “We specifically choose processes that can generate high-quality products at any scale.”

### **Potency vs. Purity**

When discussing the difference between an extract’s potency and purity, it is important to understand the definitions of these two terms. Potency typically describes the exact amount of a substance required to achieve the desired effect. Purity, meanwhile, describes the ratio of said substance, which in general is the active compound, to the total mass of the compound. There is a debate in the cannabis industry regarding whether higher potency or greater purity is more important in high-end cannabis extracts. Ken strongly believes that purity is far more important than potency. “In the realm of cannabis, a high-purity oil will require only a small amount [of active compound] to achieve potent effects.” One of the ways in which the growth of this industry is leading to higher purity products overall is the “access to a greater library of highly purified reference standards to use during analytical testing.” This allows both manufacturing facilities and testing labs greater understanding of the components in their products, as well as greater transparency in reporting those components to the general public. “This data,” Ken says, “continues to drive the industry to refine its manufacturing practices to bring high-purity—and ultimately, high-quality—products to the consumer.”

### **Separating Cura From the Herd**

Ken believes that its “technical excellence and

a team of amazing people” is the foundation of Cura, and what separates Cura from their competitors. Cura continuously looks to push the limits of extraction technology, and hires incredible people to utilize that technology to develop the products which set them ahead of their competition. “If you aren’t looking towards the future, you’ll be left in the past.”

### **Taking Extraction to the Next Level**

Ken believes that every single aspect of the cannabis industry is in desperate need of intense, thorough scientific study. This lack of scientific information has specifically negatively influenced the way most people, including lawmakers, view cannabis products. “Generations of ignorance have led to legislation that makes studying this plant incredibly difficult,” Ken states. He would like to see studies that better identify each of the components found in common extracts and concentrates. Going back to where we started our interview, Ken also sees the importance in conducting studies which report on the bioavailability of different forms of cannabis, and how these different forms correspond to changes in the entourage effect previously discussed.

It’s safe to say that with scientists and industry leaders like Ken White and Cura, the future of the cannabis industry is heading towards a bright, aromatic, and safe direction. We hope that many of Ken’s predictions regarding the future of testing labs, scientific studies, and the advent of no-nonsense legislation in the cannabis world come true. Already we are seeing a big push in private funds that are helping transform the industry from “Trendformation” to actual, scientifically-validated data. Due in large part to the legalization of this market in California, this private research is pushing the bounds on what is possible in cannabis extraction. When more states join the fold of legalized cannabis sales, so too will more private equity join the ranks attempting to pull the curtain on characterizing the wonderful substance we see before us.