

The Process of Pre-Extraction Processing

Article

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Although the careful work leading up to extraction may not get as much attention as a shiny new closed-loop hydrocarbon system or fancy commercial-grade rosin press, it doesn't negate the critical nature of the many pre-extraction protocols.

Pre-extraction processing describes all the necessary steps in the harvesting, handling, and preparation of cannabis, leading up to the extraction itself. Typically, these protocols kick in at harvest time, but for solventless extraction, they often start with strain selection.

There are, of course, trade secrets for these specific processes, but every extraction method follows the same basic principles leading up to the main event. Here, we discuss the general approaches for preparing cannabis for both solvent and solventless extraction.

Pre-extraction processing: harvest, handling, and storage

The handling procedures for cannabis heading to extraction fall into two major buckets: solvent and solventless. Nested underneath these two broad categories are the many types of solvent extraction as well as the special procedures required for live extracts.

Ethanol

The protocols for most ethanol extractions are geared for speed, efficiency, and high throughput. This is because ethanol production excels at single cannabinoid extraction on an industrial scale. Terpenes are lost during ethanol extraction, so the gentle touch required for trichome preservation is unnecessary.

Plants are quickly harvested, dried, and roughly milled for ethanol extraction. While craft producers can take a bit more care during processing, larger producers often mill the entire plant, maximizing quantity over quality.

Nate Ferguson, co-founder and chief product officer at **Jetty Extracts**, warns excessive milling pre-ethanol extraction will “create more problems with chlorophyll and other kinds of non-polar compounds that are really gummy.” In his opinion, when it comes to ethanol, “as long as you are saturating all the plant material with ethanol, doing a long enough soak, you don’t really need to grind it.” Excess grinding simply requires excessive clean up pre-distillation.

CO₂

The steps leading up to CO₂ extraction mirror ethanol pre-extraction in many ways. However, Ferguson speaks to the importance of achieving the perfect mill of dried biomass for CO₂ systems.

Ground too finely and the milling process breaks down cellular walls, resulting in chlorophyll in the final product. Ground too roughly, the solvent may channel through the columns, leaving some pockets untouched and resulting in less efficient total extraction. In his words, CO₂ pre-extraction protocols are “all about the grind and the pack of the column.”

Hydrocarbon

There has been a shift in the pre-extraction process for hydrocarbon systems, thanks to the evolving consumer market, which now tends to prefer full-spectrum products. According to **Headset’s** 2022 report on cannabis concentrates, live resin is the now most popular concentrate category in the US. Producers now take more care and time handling flower to preserve a better phytochemical profile and lock in preferred flavors.

Although “anyone can dry cannabis,” according to Ferguson, the curing process is much more finicky. As he told Analytical Cannabis, it’s “one part art and one part secret sauce.”

Curing happens in sealed containers that receive a series of burps (oxygen exposures). But the essential element during this process is time. An experienced hand uses visual and scent cues during curing to hit the ideal aromatic notes.

Throughout drying, curing, and storage, flower destined for hydrocarbon extraction can still take a bit of rough handling because it doesn’t degrade the final product. Even when crushed into vacuum-sealed bags for long-term storage, hydrocarbon extraction is selective enough to only pull the desirable compounds without picking up waxes, chlorophyll, and fats. Hydrocarbon’s selective nature still allows for faster harvesting, handling, and easier storage than solventless extraction.

Solventless

The pre-extraction process for all flower destined for solventless starts not at the point of harvest but with breeding. Not all cultivars are suitable for solventless processing because of variations in trichome morphology. Interestingly, what makes a good trichome for rosin isn't perfectly understood, although extractors talk about the broken-neck theory and trichome texture.

Rachel Sepulveda, vice president of distribution operations at **A Golden State**, a California-based cannabis producer, says solventless extractors look for trichomes with "a dryer, sandier resin," a characteristic she says is "very visually tangible." Sandier textures are much more effective for this method compared with greasy or oily trichomes, which tend to burst or wash out during the mechanical separation.

A Golden State – a recent entrant into solventless extraction – is one of many producers now basing its entire breeding program around the quest for the ideal trichome characteristics.

Solventless also requires "cleaner" growing during the final weeks of flowers. For example, Ferguson mandates what his farmers can spray, because, as he says, "even if they are organic or oil based, we limit what they can use because it can come out in the extraction."

All solventless pre-extraction protocols from harvest onwards revolve around one goal: preserving trichome heads. Harvesters follow strict standard operating procedures in this regard, not only in terms of timing between the field and freezer, but also for handling.

Jetty's growers, for example, are instructed to harvest flower and "handle it like a newborn baby," according to Ferguson. They have to literally cradle it until it's placed in bags or boxes destined for the freezer.

Jetty also packs flower destined for solventless much looser than it would be for hydrocarbon extraction. As Ferguson says, a loose pack ensures no clumping of material, "because when it freezes it all ices over, there is water in it, so you want to keep it loose." A loose, fluffy pack is just one more measure to keep trichome heads intact before the wash.

The final pre-extraction step for solventless extraction is a cold/ice water wash using a mechanical separator. It starts with soaking flower in ice water to freeze the delicate trichomes, then uses gentle agitation to remove the desirable trichome heads from the plant material. Trichomes are captured with several grades of micron bags and freeze-dried until ready to head to the rosin press.

All this careful handling, often at sub-zero temperatures, ensures the phytochemicals present in the fresh flower are preserved in the extraction. A Golden State is a prime example of this, as Sepulveda details: "You can see in our test results. Over 95% of the cannabinoids and terpenes [from the flower] are present in the final live rosin."

Cured vs. live: a temperature difference

Live extracts, including both live resins (solvent) and live rosins (solventless) are so named "live" because these extracts capture the phytochemical profile of a live plant rather than a dried and cured flower.

For live products, all flowers are flash-frozen on-site immediately after harvest, often within 30 minutes of cutting. Why is there such urgency? After harvest, the plant goes through a chemical reaction that releases some of the most interesting phytochemicals.

This means, "the terpenes, like those really light monoterpenes that you get in fresh frozen and certain

live resins, you'll lose them," according to Ferguson. Freezing just after harvest captures the most volatile monoterpenes, which are lost during the standard drying and curing process.

The frozen flower is then transported and stored at sub-zero temperatures. Sepulveda explained why to Analytical Cannabis. "[It] allows for the plant material and the trichomes to become incredibly fragile, so when we put them into the ice water, the trichomes will easily separate from the plant material."

Jetty uses cryo-freezers only for hydrocarbon extraction. They place the flower in micron bags before sending it to a cryo-freezer that reaches -90°F (-67.8°C). This incredibly low temperature produces brittle, crumbly flowers. With this texture achieved, it's then possible for handlers to gently crush the flowers inside the bags to mill the flower without undue damage prior to extraction.

How long can flower stay in a frozen state before it starts to deteriorate? Jetty has performed quality tests, finding there is little to no phytochemical degradation of frozen cannabis biomass even after a year in storage – provided it is done correctly and maintained at constant temperatures.

The power of pre-extraction processing to dictate extraction quality

The cannabis industry tends to focus more attention on the extraction itself instead of the steps leading up to it. Yet, as any extractor will tell you, what happens before processing plays a critical role in the final product.

Pre-extraction processing ultimately dictates the quality and characteristics of the concentrate. A gentle approach with harvesting, handling, and storage preserves the phytochemical composition and trichome structure, which translates into perfect expression in the extraction.



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