



## **Rosin Versatility: Leveraging Diverse Solventless SKUs to Attract Customers**

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### **Abstract**

Cannabis processors and manufacturers have many options available to them when it comes to the products that they are able to produce. This white paper will focus specifically on a new and rapidly expanding subset of infused cannabis products that are made with 100% solventless cannabis oil, which is known as rosin. While THC-dominant cannabis processing is mainly discussed, CBD applications are also considered. Rosins perhaps are now becoming known as the most versatile of all cannabis concentrates for their ability to produce both recognizably top-shelf dabbable concentrates, as well as being used to create true full-spectrum edibles, topicals, pre-rolls and much more. The applications of solventless processing methods, the starting cannabis materials that can be effectively used, and the marketplace demand for each final solventless product will be examined.

### **Background**

Concentrate cannabis products have existed for much longer than many people expect, including many business owners who are now investing their livelihoods and time into the modern cannabis renaissance that is currently underway globally. In fact, some of the earliest known records of hashish production and consumption date as far back as 1123 CE (Booth, 2011) from Cairo, Egypt. Interestingly enough, various solventless cannabis hashes predate all others, and have been produced for over a thousand years, mainly in the Middle East.

Many readers may already be familiar with Moroccan or Lebanese hashish, which was prevalent throughout the 60s, 70s, and beyond, with the first definitive article detailing the production of butane cannabis hash oil arriving in 1999 on Erowid (Bennett, 2016). As more cannabis legislation began landing in various states throughout the early to mid-2000s, the perception of cannabis, and thus hashish, created a sea change in the technologies of cannabis extraction. While the cannabis industry has effectively borrowed virtually all of its solvent-based extraction technologies from other established industries, such as perfumes and fragrances, it has only more recently begun to reawaken to the vast possibilities of modern solventless processing methods.

The core and often misunderstood difference between true, solventless processing methods and solvent-based methods is the manner in which cannabinoids and resins are harvested. Solvents, such as butane, hexane, CO<sub>2</sub>, and ethanol, work by dissolving the trichomes (which contain the majority of the cannabis plant's cannabinoids, such as THC, CBD, as well as terpenes and other important organic compounds) in the chemical solvent used. That mixture is then reconstituted, purged of as many residual solvents as possible, and then packaged in various ways for sale to consumers.

Solventless extraction methods on the other hand utilize a series of mechanical separations. Mechanical separations are distinct in that these processing procedures attempt to isolate mostly or fully intact trichome heads, which will either end up as the finished product itself or will be then designated to be pressed into one type of rosin or another. Numerous readers will be familiar with kief at the bottom of a grinder, or bubble hash that is used as a supplement to make raw flower more potent when smoked. These are both examples of mechanical separation as opposed to dissolution, where the trichomes themselves are being utilized as a cannabis product.



*Mechanically isolated, dried trichomes. Image source: PurePressure*

Rosin, which is the primary focus of this white paper, is created by the applications of heat and pressure to dry sift, ice water hash or dried cannabis flower. When trichomes or resinous cannabis matter, which are placed within filtration media have pressure exerted upon them between heated plates (120°F – 220°F is common), it expresses the pure cannabis oil onto a sheet of parchment or into a collection jar (Coddington, 2017). Because there is no process of dissolution, the definition of solventless as opposed to solvent-free applies accurately. A solvent-free concentrate, which is a now common term as well, indicates a cannabis concentrate that was made with solvents originally, but has been fully purged of any detectable residual solvents.

The discovery of the rosin extraction method is credited largely to a hash maker named Phil Salazar, who is better known simply as “Soilgrown,” in 2014 (High Times, 2017). He reportedly borrowed his wife’s hair straightener and pressed a dried cannabis flower between its heated plates, which produced a sappy oil. Since that pivotal find, one of cannabis’s “aha” moments, the solventless processing industry has expanded rapidly year over year ever since. The unmistakable simplicity of rosin has attracted many extractors as a critical production method.

In the early days of solventless extraction, it was viewed almost exclusively as a small batch, artisan approach to making top shelf dabbable cannabis concentrates. Nowadays, however, the scale at which solventless can be produced has undergone a radical transformation. Modern advancements in technology and standard operating procedures have opened up a true wellspring of cannabis product possibilities with solventless oils. While top-shelf dabs are still the primary solventless sales domain, rosins are being made with virtually every starting material imaginable (including trim, medium to low grade flower, ice water hash and sift) to create everything from the most expensive disposable vape cartridges on the market to the top-selling topicals in California, as of this writing (Headset, 2020).

Only more recently still has the data begun to validate the notion that cannabis processors and infused product makers *must* make a variety of different products in order to attract the widest array of loyal customers possible. It is no longer viable for most cannabis processors to focus entirely on one SKU subset or processing method. According to the 2019 7<sup>th</sup> edition of the Marijuana Business Factbook, the difference in the reported portion of profitable cannabis processors producing only 4-6 unique SKUs was a paltry 20%, compared to processors producing 11-15 SKUs, of which 83% reported being profitable (The Marijuana Business Factbook 2019 Team, 2019). While there appears to be a slight drop off for processors who produce 15 or more SKUs (64% report profitability), this eye-opening statistic accounts for a cornerstone insight that cannabis extractors and manufacturers need to be producing at least 11 unique SKUs, or their profitability may be impacted.

For most processors, adding multiple additional solvent-based SKUs can be prohibitively expensive, whereas solventless processing equipment is often able to be acquired at a fraction of the cost. Furthermore, a whopping 92% of cannabis processors reported a “better” outlook for their businesses for the next 12 months, and 81% of them are planning to expand into new markets in the next 12 months (The Marijuana Business Factbook 2019 Team, 2020).

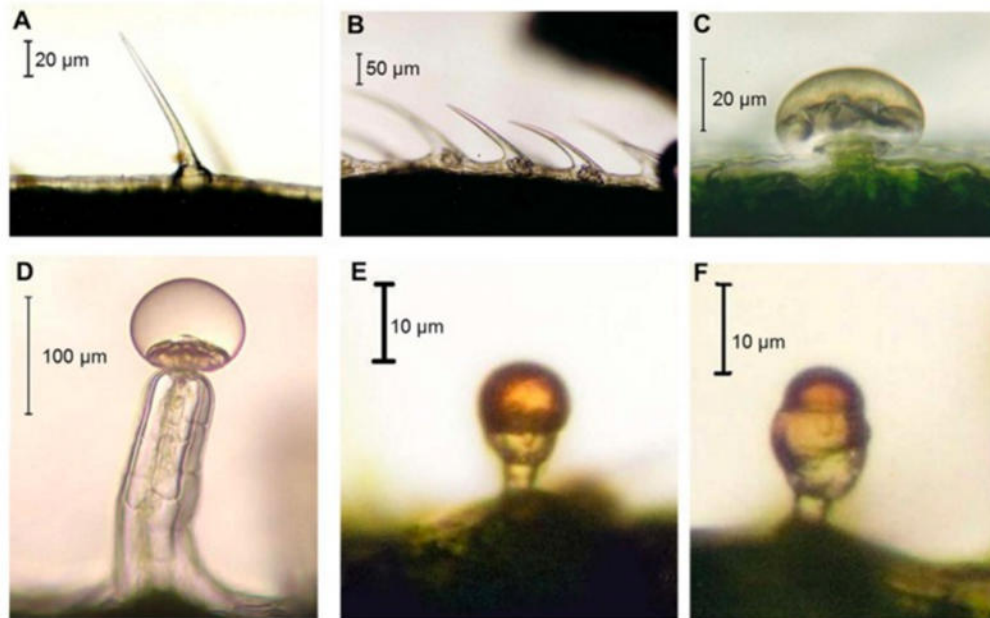
While this polling data cited above was collected pre-COVID-19, the data are mixed concerning COVID-19’s ongoing impact on the cannabis industry. It appears that demand is surprisingly resilient in most places, and even growing in some. While certain states and cities that typically depend on tourist traffic have seen decreases in their sales (such as parts of Colorado and Washington), Nancy Whiteman, the CEO of Boulder, Colo.-based edibles company Wana Brands, said that sales have generally been strong during the COVID-19 pandemic (Marijuana Business Daily News Brief, 2020).

## **Methods**

The availability, types, and level of quality of the cannabis that is planned to be processed solventlessly is what determines which sorts of end SKUs are possible for the producer. It is worth noting that, at least anecdotally, only about 1/3<sup>rd</sup> of known strains are suitable for profitable, solventless mechanical separation processing methods. This discrepancy is due to the amount of trichomes a plant produces, but most importantly, what sizes and shapes those trichomes take when fully matured. Simply put, if there is more juice to squeeze, that helps with making rosin, but that is not the only factor—nor is perhaps even the most important one.

Trichome shape and size now appears to be the key factor in profitable solventless yield determinations. At the microscopic level, there are many different types of trichomes, such as

unicellular non-glandular trichomes, cystolithic trichomes, capitate-stalked trichomes, simple bulbous trichomes, and complex bulbous trichomes, which all offer varying challenges to being captured intact (Porter, 2017). Ranging from as small as 10µm for many simple bulbous trichomes, to upwards of 120µm or larger for the most resinous capitate-stalked trichomes, the micron size of the trichomes each plant produces is critically important in the filtration and capture process for both dry sift and ice water hash.



**Hemp trichome types.** (A) Unicellular non-glandular trichome; (B) cystolithic trichomes; (C) capitate sessile trichome; (D) capitate-stalked trichome; (E) simple bulbous trichome; (F) complex bulbous trichome.

*Images kindly provided by Dr. David J. Potter / Front Plant Sci.*

*Image source: (Porter, 2017)*

The king of solventless-friendly trichomes are the capitate-stalked, or glandular-domed, trichome type. This is the classic trichome you may be familiar with seeing: a large, spherical head perched atop a stalk. These trichomes are the most likely to capture fully intact, or nearly intact, because of their size and shape. They also typically contain the most resin and can be thought of as the best fruits that cannabis plants have to offer. Capitate-stalked trichomes with large heads and thinner necks offer the best detachability characteristics, which can be verified pre-processing with a jeweler's loupe or any sufficient magnification available. Trichomes on the smaller end of the spectrum tend to be best utilized for food grade applications, such as topicals or edibles, whereas larger captured trichomes are often best for dabbable concentrates. Anecdotally, CBD strains tend to produce smaller trichomes, which are more easily captured via sifting methods.

Processors have many choices when it comes to which starting material(s) they wish to extract from, but two methods of solventless extraction that come before the rosin pressing stage stand out. Those are the dry sifting process, and ice water hash washing. Both methods share a common goal, which is to preserve the integrity of the trichome intact. In the case of dry sifting, as the name implies, the starting material is dry to begin with, so typically trimmings or mid- to low-grade flower is used, but not always. Top colas and premium flower can be processed with

dry sift, which can make among the highest quality solventless concentrates on the market. Sifting works by shearing the trichomes off of the starting material with screens consisting of different sized apertures, frequently ranging from 90µm to 220µm. As the trichomes detach from the trim or bud, they settle on a tray and then are collected to be packaged or pressed into rosins.

The ice water hash washing process typically begins with fresh frozen cannabis buds, which are then immersed in ice and water, and then agitated to induce trichome detachment. The slurry of water and trichomes is then drained, filtered through different sized screens (with apertures ranging from 25µm to 220µm), collected and finally freeze dried. The quality and types of trichomes that come out the other end of the process are then graded, packaged and sold, or pressed into various rosins. High-quality, isolated trichome heads and stalks offer by far the most SKU versatility as many exotic rosin hash products demand them as a starter.

Ice water hash is the primary solventless mechanical separation process that creates a “live” product, with the word live indicating that the starting cannabis had been frozen, not dried or cured. This important designation offers flavor and experience profiles that many consumers are looking for, and which were first made popular via hydrocarbon extraction, known as live resins. While it is possible that sifted products can start out freshly frozen, they too must be dried properly, often in a freeze dryer after sifting has occurred, to be pressed into rosin.



*8 different solventless SKUs made from a single batch of ice water hash.  
Image source: SimpsonSolventless*

While dry sifting and ice water hash washing get the lion's share of the attention in the world of solventless extraction, humble flower rosin still offers enormous promise for many producers. Flower rosin is by far the simplest rosin to produce, even though it is somewhat more limited in the number of end SKUs that can be made with it (although not by much). To perform this, all a producer needs to do is to insert properly dried and cured cannabis flower into filter media and then press it on a rosin press. The oil is immediately available to be used, like all other precursor rosin materials, and requires no purging. Any dried and cured flower may be used, but like with all solventless mechanical separations, the more freshly harvested the material is, the better it will perform when extracted.

Both dry sift and ice water hashes are frequently sold as-is in various grades, which is known by their "star" ratings of 1 through 6, with 6-star products being the very best (Ward, 2018). This rating scale is subjective in many ways, but what separates a 6-star dry sift or hash from a 5-star is that it melts completely when vaporized, leaving no residue. This type of product is famously known as full melt and is a top choice of connoisseurs globally. Full melt is truly the cream of the cannabis crop and can only be produced using the top echelon of high-quality cannabis buds. Fresh frozen material is almost always the starting point for producers attempting to make full melt. Beyond full melts, full spectrum ice water hashes are more commonly sold than dry sifts due to what appear to be latent consumer preferences. These are comprised of 4- and 5-star rated products which are priced in the market appropriately to their perceived quality. 1-, 2-, and 3-star sifts, or hashes, are often repurposed for food-grade rosins to be infused into other products.

Finally, we arrive at rosins and the processing methods used to achieve the different SKUs and consistencies discussed in this white paper. Different amounts of heat, time, and pressure are all utilized by the extractor on their rosin press to create different viscosities or textures of rosins. The standard operating procedures and techniques of the extractor combined with the quality and type of material used determines the final potential outcome of the rosin being produced.

With this much potential, many readers will be wondering what types of solventless SKUs are possible, and which ones could make sense for the plethora of different cannabis markets throughout North America and the world. Rosins can be made into just about any texture or consistency known, such as vape cartridges, viscous oils, budders, waxes, sauces (raw separated terpenes), diamonds (THCA isolate, typically combined with raw terpenes) and everything in between. Processors have also begun to find ways of creating high CBD solventless concentrates for many of the same kinds of SKUs. All of these solventless oils and textures can easily be decarboxylated for edible or topical applications, which is attractive both to THC and CBD focused processors. This level of processing versatility is largely dependent upon the types of starting materials that are used, which are dictated by whether or not the processor is vertically integrated or must purchase cannabis from another source.

## **Applications**

Before a processor begins pressing rosin or even sourcing material to do so, the strategic selection of which solventless SKUs they intend to produce is paramount to a successful rollout. The best way to do this is to carefully consider what the consumers in the market a processor operates in are actually looking for. The more mature the market is, the more likely the appetite

for high-end dabbable concentrates becomes. In newer markets, other solventless infused products can offer a key differentiator for their manufacturers to get an early start attracting customers.

Concentrates and infused product growth data figures across markets are mixed, but it does appear clear that in most instances the growth of concentrate sales occurs consistently as markets mature, and that strong future growth is predicted in virtually all processing categories (Arcview Market Research, 2018). Similarly, different markets have much different levels of demand concerning the cost of concentrates and infused products that consumers are willing to pay. This is crucial to understand when a processor is determining whether or not to roll out a high-end solventless dabbable concentrate, an infused edible product, or most likely a mixture of complementary solventless SKUs. Beyond top-shelf live dabbable concentrates as a processor's major solventless brand builder, infused pre-rolls, topicals and edibles are all categories ripe for SKU creation.

The types of solventless SKUs that can be produced break down broadly into the following categories:

### **Vape Cartridges**

- Ice water hash rosin vape cartridges
- Dry sift rosin vape cartridges

### **Top Shelf Dabbable Concentrates**

- Ice water hash rosin (including live, all textures/types)
- Dry sift rosin (all textures/types)
- Flower rosin (all textures/types)
- Full spectrum ice water hash
- Full melt ice water hash
- Full spectrum dry sift
- Full melt dry sift
- THCA isolate

### **Infused Products**

- Infused premium pre-rolls (with dry sift, or ice water hash)
- Topicals and balms (all varieties)
- Edibles (all varieties)
- Beverages (all varieties)
- Infused flower, also known as caviar (all varieties)
- Suppositories

### **Smoked Concentrates**

- Hand-pressed "old world" ice water hash (all varieties)
- Full spectrum dry sift (flower potency enhancer)
- Full spectrum ice water hash (flower potency enhancer)



*Mechanically separated raw liquid terpenes from ice water hash.  
Image source: PurePressure*

Processors must then weigh what solventless concentrates they wish to create against what types of cannabis material they have access to. Many of the infused products listed here can easily be made with rosin from solventlessly processed trim or low- to mid-grade flower. This is because the color of the resulting rosin, which is usually darker, is not the determining purchase factor in the customer's mind since it is mixed into whatever is being made. CBD flower or trim is most often sifted before being infused. Extra flower that may not be suitable for shelf sale can easily be repurposed for solventless extraction. Solventless infused products, such as edibles and topicals, can also command premium pricing over their conventional counterparts—sometimes as much as 30% or more.

For premium solventless dabbable concentrates, the opposite is true: a processor needs to source the highest quality cannabis possible to achieve the type of end product that meets the demands of customers willing to \$60 per gram and up. Live ice water hash rosins are known to be the leading solventless product in the market and are what many solventless producers aim to make initially. To many, the holy grail of solventless is the rosin cartridge, made without any cutting agents or fillers. In order to achieve this product, processors must first master the ice water hash and ice water hash rosin extraction processes.

Processors of all sizes, big and small, can leverage solventless concentrates to carve out and attract important customer segments to their brand. Put bluntly, if your extraction operation is not producing solventless products of some variety, it is not likely to be considered a premium brand in the marketplace. Anecdotally, cannabis influencers and consumers prefer solventless products in many instances, making them one of the most powerful brand builders in a processor's arsenal. The same kind of customer who is willing to pay high prices for the best cannabis concentrates often tends to be the kind of person who talks about them or considers themselves a connoisseur. Solventless oils, when taken as a whole, offer tremendous versatility and require much lower startup costs, enabling smaller operations to get started more easily. For larger existing processors or MSOs, solventless concentrates can add crucial new premium SKUs to their existing product lines. As unique differentiating factors figure more and more into processor's production goals, solventless is certain to be seen as a go-to choice for both startup extractors and established operations.

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