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DIY DEEP WATER CULTURE

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THE LOST ART OF THE HASHISHIN

The Workshop: Part 5

Ice Water Sieving

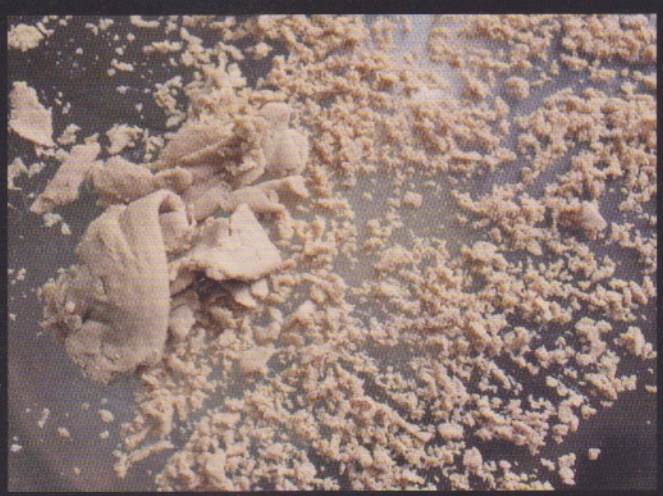
In the previous sections, traditional dry sieving techniques and the evolutionary advantages of using water were covered. Part 5 will focus on the only drawback in the ice-water process, the need to perfectly dry the collected resin.

Drying is the most delicate and challenging part of the ice water sieving process. It has to be perfectly executed so that there is a minimum loss of terpenes and no humidity left that could later degrade the resin stability and quality.

Words by Frenchy Cannoli

Drying in a Room

A dedicated drying room is mandatory. Don't waste time processing material until the drying space has been prepared. The room conditions need to be stable with a humidity level of 35%, and a temperature of 55°F (12.8 C), the use of an air conditioner and dehumidifier is in most case necessary to create ideal drying conditions. The drying space has to be and to remain absolutely immaculate with adequate and indirect air ventilation to optimize the drying process and an air filtration system to minimize contamination. The room should stay dark as much as possible to avoid light degradation. Access to the space should be limited for those reasons. Wearing a set of clean, dry clothing and footwear when entering a drying room is recommended.



Drying Racks and Shelving

One of the main logistical problems with drying resin in a room is the amount of space necessary to optimize the process. The resin has to be separated as finely as possible and spread widely on parchment paper spread over shelving to dry evenly and rapidly; as a loose reference a 26 by 18 inches (66 by 46 cm) commercial kitchen rack should not hold much more than 3-to-4 grams of resin heads.

The drying room space should be made up of easily accessible, well-spaced shelving. The most adaptive, effective and cost-efficient configuration for a drying space of any size and shape is floor-to-ceiling wall shelving with a few

20-tier commercial kitchen racks on wheels.

Note: Do not use solid aluminum trays to support the parchment paper and drying resin. The water content evaporating from the tray underneath will tend to condense on the cold surface of the metal overhead which can create problems. It is more effective to use cooling racks which allow direct airflow on the parchment paper supporting the wet trichomes heads, skipping every other spacing will improve airflow as well and maximize the overall drying process.

Resin Separation with a Metal Sieve

Tools: Small fridge, large metal sieve, a metal spoon

Take the resin heads, the spoon and the metal sieve from the fridge where they had been placed previously to chill. Place the trichome heads in the metal sieve and use the metal spoon to push them through the perforations over the parchment paper. It is necessary to keep moving slowly and steadily over the surface of the paper in order to spread the resin heads evenly, and as widely and thinly as possible over the surface of the drying rack. It is not recommended to try separating chunks of resin further by hand immediately. The wet resin heads, while being separated will coagulate into a mass at the slightest pressure.

After a night of drying, the trichomes heads will be easier to manipulate and spread more thinly and evenly. However, the metal meshes of the sieve and the pressure of the spoon will damage some the membranes of some of the trichome heads generating terpenes loss and cannabinoids degradation.

The fineness of the resin spread over the parchment paper, the characteristics of the resin, the stability of the room temperature and humidity as well as the air flow will define the duration of the drying, which can range from 2 to 10 days.

The capacity of the drying room will define the overall production.

A metal sieve and a spoon may not be enough when working with really sticky resin. In this case, you will need to chill resin before processing or use a micro-plane.

Resin Separation with a micro-plane

Tools: Small freezer, metal micro-plane (grater)

A micro-plane grater, also known as a zester, is a kitchen tool used to grate citrus finely - lemon, lime, or orange skins, as well as cheeses like Parmesan. It is possible to use a micro-plane to separate sticky resin when the resin is frozen, and the workroom is very cold, with temperatures in the mid-to-high 40s Fahrenheit (5 to 10 Celsius). Separating the resin heads to the finest level possible is vital to optimizing the drying process; for this reason, a micro-plane works perfectly. However, the tool is made of very sharp teeth that will damage a much higher percentage of trichome membranes resulting in a higher loss of terpenes and resin degradation.

Take the resin, the micro plane and a small metallic serving tong or a metallic kitchen glove to hold the frozen resin from the freezer where they had been placed previously. Hold the mass of frozen resin heads with the tong (or the metallic glove) and grate it on the micro-plane over parchment paper. It is necessary to keep moving slowly and steadily over the surface of the paper in order to spread the resin heads evenly and as widely and thinly as possible over the surface of the drying rack. It is again not recommended to try separating chunk of resin heads further by hand immediately, the wet trichomes heads while being separated will coagulate into a mass at the slightest pressure; after a night of drying, the resin will be easier to manipulate and spread more thinly and evenly.

The fineness of the resin spread over the parchment paper, the characteristics of the resin, the stability of the room temperature and humidity as well as the air flow will define the duration of the drying, which can range from 2 to 5 days.

Drying under poor conditions

It is not a good idea to collect cannabis resin using the ice-water methodology if you do not have adequate space and conditions to dry.

It is vital to the overall quality of the dried resin to dry in a cold

and dry environment; the climate of your region will dictate your approach. A small room can be sufficient in certain regions most of the year, an unused refrigerator, cleaned to the level necessary to avoid any contamination of the resin can be used when the temperature is too high. It offers a limited amount of space but will be cold and dry. A wine cooler is also a good solution to create an adequate environment.

Without the use of a dehumidifier to absorb the water evaporating from the trichome heads, a different approach needs to be applied in order to capture as much of the water content as possible. The use of bath towels, paper towels or cardboard underneath the parchment paper is an adequate and simple solution which only requires changing the absorbing material regularly. Some level of humidity will nonetheless be created, and the use of some type of moisture absorber is mandatory to create viable drying conditions.

When drying under poor conditions, the fineness of the resin spread over the parchment paper will become the most defining factor of the drying process itself while the drying space temperature will define the terpenes retention; the drying time can range from 5 to 15 days.

Drying with a Freeze Dryer

Freeze-drying, also known as lyophilization[1], is a low-temperature process that removes the frozen water content from the material through the process of sublimation and then removes most of the remaining moisture content of bound water molecules through the process of desorption. The freeze-drying process has been used to preserve the integrity and potency of pharmaceuticals since World War 2 and has been used in the food industry since the 1960s. The process offers the longest shelf life and preserves to an unparalleled level the natural structure, the chemical compounds, the color and nutrients of all products with water content.

Freezing:

The product must be perfectly frozen for the process to be successful. Flash freezing produces small ice crystals that preserve the frozen material's structure but are challenging to freeze dry due to their small size while conventional freezing creates larger ice crystals that facilitates the sublimation process.

Vacuum:

Once the product is frozen a vacuum below the triple point of water takes place.

Sublimation (Primary Drying):

Sublimation is the change of ice, the solid state of water, directly into a gas form bypassing the liquid state. Water cannot exist in a liquid form in a vacuum, ice "sublimates" directly from solid to vapor without melting.

Desorption (Secondary Drying):

The sublimation process eliminates all water that is in ice form while desorption removes any remaining unfrozen water molecules bound to the product. The drying temperature applied during the secondary drying is usually higher, the pressure is frequently lowered during this phase, but not in all cases, and the cycle is a third-to-half the time of sublimation.

The characteristics of the product itself define the freeze-drying process; every product requires its own protocol. There is no general setting compatible for all products due to the varying levels of water content by item. The water content of an apple is vastly different from a strawberry, a tomato, seafood or meat, and as such a specific protocol is applied for each product.

I know of no general setting for cannabis resin. The water content present in the mass of resin heads collected will define the appropriate settings for the freeze dryer, and there are so many factors coming into play that we may not be able ever to have a "one-size-fits-all" protocol.

Due to the trichome head's characteristics, there is an extreme variation in water content. Tropical cultivars from Africa and South America have a sticky resin that holds and retains water differently than cultivars from the Kush mountains that have a sandier characteristic, and the diversity born from hybridization reinforces this problem.

The collecting processes used also brings huge variable into the equation. No two Hashishin will retain the same amount of water in the resin heads they collect. It is hard enough for a single Hashishin to shape the collected resin heads from each wash consistently in order to retain a relatively similar amount of moisture in each. I recommend silicone molds to help minimize the difference in water content and thickness between patties.

Harvest Right Freeze Dryer Settings (Scientific Model):

The following protocol is specific to my overall methodology since I press the loose trichomes heads after drying, I make

patties from each wash, which while all being different sizes, are of the same thickness and contain a relatively equal amount of water proportionally spread in their mass. Patties have the advantage of taking less tray space in the freeze dryer and allow me to keep my dimensions of ripeness (washes) nicely separated as well.

Pre-freezing cycle at -25° Fahrenheit (-31.6° Celsius) to keep the resin from melting when transferring the patties from the stand-alone freezer where they are pre-frozen and held before putting them on the freeze-drying trays which have been covered with parchment paper for the first step of the drying process, the freezing.

Freezing cycle for three hours at -25° Fahrenheit (-31.6° Celsius) without pressure.

Sublimation cycle for twenty-four to thirty hours at 30° Fahrenheit (-1° Celsius) with the pressure set between three-hundred and six-hundred.

Desorption cycle for twelve to fifteen hours at 35° Fahrenheit (-1.7° Celsius)

Waiting cycle for twelve hours at 25° Fahrenheit (-1.9° Celsius) which gives me the ability to empty my freeze dryer at any time during these 12 hours.

Defrost cycle for three hours at 120° Fahrenheit (49.9° Celsius) to melt the ice formation on the walls of the machine caused by the water sublimated during the process.

Fine-tuning the process

It is essential to control the drying of the patties when taking the trays from the freeze dryer. The patties should have a perfectly unified color when broken open, any difference in coloring indicates an imperfect drying, and you will have to start the process again, but you will need to reduce the length of the process for the second round.

If the patties are perfectly dry and the water coming from the defrost smells strongly of terpenes, it will be necessary to fine-tune your protocol by slightly lowering the temperature and lengthening the sublimation and desorption processes.

Note: The patties have a loose structure when taken from the freeze dryer during the "waiting cycle." At this point, the resin heads can be easily separated into a fine texture over drying racks using a metal sieve and a spoon as is done when drying in a room, a point of interest for anyone not pressing their trichomes heads as I do.

Note: It is also possible to obtain loose separated resin after freeze-drying by starting with a resin mixture containing a higher water content, a porridge-like mixture that is poured onto the parchment paper placed over your trays.

References
1. Lyophilization/Freeze Drying By GR.Nireesha, L.Divya, C.Sowmya, N.Venkateshan, M. Niranjan Babu and V.Lavakumar https://pdfs.semanticscholar.org/d9f4/a4b942c8ecaa128daeb1eeb4fde95a80d1e9.pdf)
2. The single combination of pressure and temperature at which liquid water, solid ice, and water vapor can coexist in a stable equilibrium occurs at exactly 273.1600 K (0.0100 °C; 32.0180 °F) and a partial vapor pressure of 611.657 pascals (6.11657 mbar; 0.00603659 atm). At that point, it is possible to change all of the substance to ice, water, or vapor by making arbitrarily small changes in pressure and temperature. (Wikipedia)

Part 6 will be the last article of The Lost Art of the Hashishin Workshop series and will be dedicated to the pressing process, packaging, and aging.

Frenchy Cannoli is a consultant, educator, and writer in the Cannabis industry with special focus on hash making using traditional methods. Frenchy can be reached through his website at: www.frenchycannoli.com or seen on Instagram @frenchycannoli

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