



BEYOND BUDS

– MARIJUANA EXTRACTS –

Hash, Vaping, Dabbing, Edibles & Medicines



by Ed Rosenthal

with David Downs



Bubba Kush bubble hash.

Photo: Bubbleman

Chapter 4.

Advanced Hash— Beyond the Basics

Concentrated cannabis may be the future of marijuana as a medicine and as a recreational substance. You've read about how water and ice can be used to mechanically separate trichomes from the plant, and filters can concentrate the glands into unpressed hash. Now you'll see these processes are further refined using machinery and tighter control of temperature and humidity to yield the strongest nonsolvent concentrates. We'll also detail pressing classic hashish, which is a collection of marijuana's resinous glands compressed into balls, cakes, or slabs.



Nonsolvent extracts.

Photo: Pollinator



Several kinds of hash, including Nepalese Temple Balls, Blonde Lebanese, and Afghani slabs.

Photo: Ed Rosenthal

The origins of hashish date back millennia and are believed to have begun in Asia, near the Hindu Kush region. Hash making has a long tradition in many countries near the 30th latitude, including India, Nepal, Afghanistan, Pakistan, and Lebanon.

Making hashish is a two-step process. In step one, the glands are collected. All collection methods yield a consumable product, but it is not yet hashish. Hashish involves a second step: compressing the collected material into bricks or balls.

Sifting for kief is the primary low-tech way to collect glands for hash. Water hash can be pressed using the same methods. Another method of collection—hand rubbing—dates back to ancient times. While low in yield, this often produces extremely high-quality hash. Hand-rubbed hash is collected fresh from the plant, and the resin is still

sticky, so the method of pressing involves a slightly different process.

Pressing hash involves a combination of force and mild heat to condense the glands into a solid mass. The shape and size of hash varies depending on the pressing method. When hand pressed, hash is often ball-shaped. Flat-pressed hash may look like thin shale rock, with hardened shelf-like layers that chip along the creases. Mechanically pressed hash is usually a neat cake, like a bar of soap. Hashish ranges in color and pliability. The variety of marijuana used, manufacturing method, temperature, and the purity of the kief influence



Mechanically pressed hash.

Photo: DoobieDuck.com

its color, which ranges from light yellow-tan to charcoal black, and its texture, which ranges from pliable taffy to hard and brittle.

Hashish oxidizes and darkens from exposure to light, oxygen, and heat. Regardless of its texture, high-quality hash should soften with the simple warmth of your hands.

Aficionados often describe the high that hash produces as more complex than that of kief. In the region of traditional hash making, kief is typically aged, sometimes for a year or more, before it is pressed. Most modern hash makers do not wait that long.



Full melt bubble hash.

Photo: Steep Hill Halent

WHAT IS HASHISH?

Ask Ed

Ed:

What exactly is hash?

*Shales
Oakland, California*

Shales:

Hashish, or hash, is a conglomeration of crushed and heated glands or trichomes. Using gentle heat and pressure the gland heads' membranes break, releasing the viscous liquid. The pressure forces out the air, leaving the pure mass of crushed glands.

Hash can be made as easily as placing some kief in cellophane, wrapping it carefully, and then placing it inside the heel of your shoe. Walk and stand on it for 15–30 minutes, and unwrap the newly pressed hash. A friend showed me how he makes it using a thin cotton cloth to wrap the kief. Then he presses it using a dry iron. Commercially, hash is made using high-power presses. The most sophisticated of these units heats the material in addition to applying pressure.

TIP: Unpressed kief oxidizes in warm temperatures, while hash is more resilient to warmth, so long as it is pressed when it is totally dry. When pressed wet, however, hash molds. You can store material in its unpressed form in a cool, dark place. Once pressed, hash stored in the freezer suffers little from aging.

INTRODUCTION TO ADVANCED WATER HASH

Water hash can be as strong as and tastier than the newer solvent hashes. In the 2013 Emerald Cup—a longtime, outdoor organic medical marijuana competition in Northern California—the first- and second-place water hash winners tested at 67% and 70% THC, a metric once thought impossible for old-school bubble hash.

Advanced water hash uses the same principles outlined in the Water Hash chapter, it just takes into account more variables, from the strain type and trichome shape to harvest methods and ambient temperature and humidity in the washing room.



Converted cold-water washing machine being loaded with trim to make hash.

THE MACHINE METHOD

There are several key principles for producing the highest-quality, dabble water hash.

First, trichomes must be treated gently. Mechanical agitation in the ice-bath stage is needed, but it's also the enemy. Paint mixers are too rough for award-winning bubble. Use a special machine such as the Bubbleator (from the Pollinator Company), the Bubble Now, or the gentle cycle on a washing machine modified by removing its filters.

Second, heat is an enemy. It can dry out buds and sap them of their flavors and strength. During drying, high temperatures vaporize the hash's great flavors. Storing hash at a high temperature degrades its flavor and potency.

The result of paying attention to the fundamentals of the process is phenomenal. High-grade water hash is being rebranded as “solventless wax.” It gives consumers who want to dab a tasty, effective option that doesn’t involve explosive solvents.

Equipment

- 20-gallon Bubble Now, Bubble Magic Extraction Machine, Bubbleator, or top-loading washing machine
- Bubble Bags (microns—220 zippered to hold the grass in the washer; 160, the first filter, removes contaminants; 73 for low-grade; 25 for high-grade)
- Cannabis (1000 to 2500 grams, frozen, high-tri-chome leaf)
- Water (filtered for best results)
- Ice—enough to fill the machine 60% full, and refill it as it melts
- 20-gallon bucket
- Alcohol or hydrogen peroxide
- Gloves
- Spoon
- Sieve
- Parchment paper
- Thick cardboard



Bubbleator.

Photo: Pollinator

Method

Consider the best location for setting up the machine. The best situation is a sterile lab setting. Hash is very sticky, and captures contaminants floating in the air, such as dander, dog hair, and dust. A room with filtered air is best. Outdoors, dry dusty days are a poor choice, but days after a rain when the air

is clean are acceptable. The ambient temperature is best below 65°F (18°C) with low humidity—between 15% and 50%. Hash is oxidized and darkens when it is manufactured or stored for long periods at high temperatures such as 80°F to 90°F (27°C to 32°C).

Next, consider the source material. Dried, cured, sugar leaf works fine, but the best water hash is made from fresh-frozen material. Trichome-rich leaves are cut from ripe plants, bagged in Ziploc freezer bags, and frozen. Freezing locks in all the terpenes and cannabinoids present on the plant at the time of harvest, rather than losing significant amounts of both to drying, curing, and processing.

Thoroughly disinfect the machine, hose, bags, and buckets using hydrogen peroxide.

Line your 20-gallon bucket with filter bags, starting with the finest 25-micron bag and ending with the biggest 160-micron bag.

Place the machine's outflow hose into the filter bucket.

Place a base layer of ice in the machine.

Fit the open, 220-micron bag in the machine and add the material.

Fill the bag half-full with nine parts trim to one part ice. Alternate adding trim and ice. Zip up and tie the top of the bag, and pour more ice over the bag until the ice level reaches eight inches below the rim of the machine.

Next, add water until it's four inches below the surface of the ice. Wait 15 minutes for the trim to soak up the water, then add more ice and water, until the water is below the ice's surface level, and the ice is eight inches below the rim of the metal basin. Leave room for the mixture to agitate.

Turn the machine on gentle and monitor the agitation. Use wooden spoons to help the bag settle into the ice bath. Add more ice and water as the ice melts and settles. The color of the water should turn completely gold quickly. On a standard washing machine, use the gentle cycle. DO NOT let the device automatically drain. Run two gentle agitation cycles—*then* let it drain.

During this ice-cold agitation process, the brittle, frozen trichomes will have snapped off the leaf, traveled through the lining of the 220-micron “garbage” bag, and into the ice bath. The water turns green and the plant oils make the surface of the water frothy.

After agitation, the machine pumps the trichome-rich water out of the washer basin and into the filter bags, which are set up inside the 20-gallon bucket.

The inside of the bucket will be foamy with cannabis oils. Jiggle the bucket gently to help water pass through the filters and use filtered ice water in a small pump sprayer to rinse the trichomes off the bag's sides and down and through the 160-micron filter.

Start pulling the bags up one at a time.

First pull out the “garbage” bag. The material inside the bottom of the bag looks like green silt. Rinse down the edges, get everything collected in the bottom, and pull out the garbage.

Pull the second bag, then spray, jiggle, and repeat. The 73–160-micron stuff is a little green, but not as green as the first bag. Keep pulling, spraying, and jiggling until it’s all collected in the middle of the mesh. Trichomes smaller than 70 microns pass through the mesh but everything from 73 to 160 microns will be collected. (The sweet spot for trichomes is 70 to 160 microns, with tinier ones better for dabbing, and the bigger stuff more suitable for edibles.)

Pull up the bag to the top and spoon out the green-colored wet paste onto parchment paper set on a towel or thick cardboard, or something else that will safely wick moisture away.

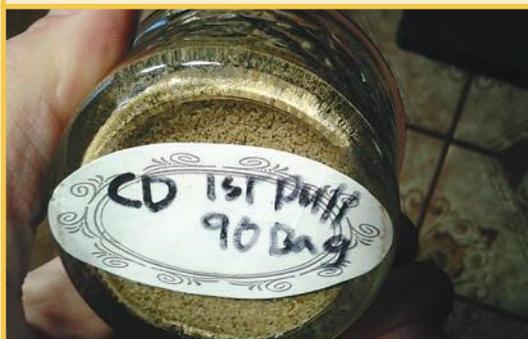
The next bag catches the vast bulk of trichomes between 25 and 73 microns. The material in here is both green contaminant and gold trichomes. The goal is to push the green through the screen while holding on to the gold.

Pull the bag up; it’ll be heavy with water, its pores clogged with trichomes. Much like panning for gold, you want to lightly spin the emulsion while spraying down the sides. The mesh holds on to the glands while the fine green particles fall through with the water. Keep spraying, rotating, and pulling until the green is gone and it just looks like a bunch of golden sand.

Remove this light clay-like wet hash from the mesh and place it on a drying surface. Once the bottom of the mesh bag is scraped clean of any remaining



73-micron hash.



90-micron hash.

Photos: David Downs

hash, use a sieve and spoon to redistribute and aerate the drying hash on a wider surface area.

You will have two piles: the 25–73-micron pile, which is full melt suitable for smoking, and the 73–160-micron pile, which is great for baking.

Leave it to cure for 12 to 24 hours. It's done when it is totally dry and crumbly between your gloved hands.

Drying

There's a compromise in drying—trying to remove moisture from the hash without also vaporizing off the delicious yet volatile essential oils, or terpenes. Use a spoon to break up the wet clumps of hash and spread it evenly on parchment paper on a thick cardboard drying board.

Drying should be done in a room with a temperature between 40°F (4°C) and 68°F (20°C). The reason for the low temperature is that some terpenes evaporate at 70°F (21°C).

Humidity is also a factor, with sub-30% humidity being optimal, but it can vary by strain.

Under magnification, the final product will look like sandy heaps of full, sticky, oily, trichome heads. Store in a cool, dark place, and don't press until the material is completely dry.

Tips

- Check the seams to make sure your bubble bags are not inside out.
- Inspect the machine output hose line for leaks.
- Use a gravity-based system with suspended bags and buckets to save your back.
- Buy bags with lots of mesh area, durable sidewalls, and consistent micron spacing—cheap eBay bags often have inconsistent micron widths in the center of the mesh versus the edge.
- Keeps hands off the trichomes.
- Trim wet and freeze.
- If you make water hash often, invest in an ice-making machine.
- You don't have to use as much ice when using large cubes. They don't melt as fast as small pieces.

- **Strains:** Different strains yield differently sized and shaped trichomes, and differing amounts of oils and terpenes. Hashing Blue Dream versus hashing Bubba Kush is like night and day at the micron level. Blue Dream trichomes are long and thin, and you can raise the temperature and humidity during drying. Bubba Kush, Sour Diesel, and OG Kush glands are short, stocky, and oily, and need to be processed at as cold a temperature as possible and dried at 40°F (4°C) under minimal humidity to capture the resin's odors.
- **Cultivation Environment:** Outdoor-grown cannabis tends to have smaller trichomes (120 microns) than indoor (160).
- **Bag Size and Number:** This can vary. You can use as little as two 25- and 160-micron bags, plus a 220-micron garbage bag for simplicity's sake, or pull and spoon progressively narrower bands of glands and materials at 90, 73, and even 35 microns.
- **Agitation:** Purists sometimes use something as basic as a pole or paddle to gently hand-agitate the main bag in the bucket; the trade-off is in the yield. A 30-minute machine wash of 1,000 high-quality grams can yield as much as 112 grams of top-shelf hash. Less agitation equals purer hash but lower yield.

HASH FACTS

- The color and consistency of hash varies considerably. However, it softens and crumbles from very mild heat, even the simple body warmth created by holding it in your hands.
- The quality and potency of hash is dependent on several factors including the quality of the plant material from which it was made and the presence of moisture.
- Moisture enables molds to attack hash. It is indicated by a musty smell and by visible white streaks within the hash. Moldy hash should never be smoked or ingested. It can make you sick.
- Hash burns slowly with an incense-like fragrance. The flavor of the smoke is often peppery or slightly spicy, often with floral undertones. When burned, it produces thick, white smoke that sometimes carries a bluish tint. The resulting ash is white.

PREPARING KIEF OR WATER HASH FOR HASH MAKING

Kief and water hash methods of collection are covered thoroughly in chapters 2 and 3. While these two processes have different advantages, each yields dry, loose material that can be pressed to make hash. Before attempting to press kief or water hash, the material must be completely dry. To ensure that all moisture has been eliminated before pressing, dry the material one last time. Place the kief or water hash in a food dehydrator set on the lowest setting, a horticultural heat mat (preset at 74°F [23°C]), microwave the material on low, or place it in an open dish in a frost-free freezer. The vacuum conditions promote water evaporation, preventing mold from infecting and spoiling the hash. However, when the drying temperature is above 75°F (24°C) some of the terpenes will evaporate, costing the hash a panoply of unique odors and their effects.



Collecting hash resin.



Rubbing hand hash to create a ball.

Photos: Ed Rosenthal

COLLECTING BY HAND: RUBBING FOR HASH

There are many tales about collecting hash from fresh plants. Hand rubbing for hash has been a common gathering method for centuries in some parts of Asia, and it is still a primary way of collecting for hash in other parts of the world.

Because it requires no equipment, hand rubbing is a novel and spontaneous way to collect for hash, but this method also has several downsides.

First, the effort required to produce substantial yield is greater than with other methods. It can be messy and labor intensive. Second, hash collected this way contains debris from plants and hands, and contains more water, making it more likely to spoil. Hand rubbing requires access

THE HAND-RUBBING TECHNIQUE

Before starting collection, coat your hands with a little cooking oil, then pat it off with a towel. The thin oil layer makes the palms a little sticky, helping to attract the first glands. It also makes removing the resin from the hands easier.

First, choose the right time of day. Early morning is not a good time if the plants are moist with dew. Wait until the day warms a bit and the plants have been under the sun long enough to be totally water-free.

Rub the plants very lightly, starting at the top of the plant and working down rubbing the topside of the leaves. Remember that the glands' heads are tiny globes supported by stalks sticking up from buds and the upper side of the leaves. Think of brushing the fine hairs of a person's arm while only barely touching the skin. Use the same technique for resin rubbing.

As soon as you start rubbing, your hands will begin to collect the sticky, tar-like resin, and the air will be filled with the plant's heady aroma. High-quality resin creates a clear sticky gloss on the palms, darkening to amber as the resin builds up. Only resin should be collecting on the hands. This is a clear indicator that you have chosen the right time to collect. Lots of pieces of plant material on the hands indicate that the plant contains dead leaves. If it isn't inconvenient, removing them before rubbing will improve the quality of the rub.

If you are collecting green material you are probably rubbing too vigorously. It is nearly impossible to avoid attracting some errant leaf bits and particles onto your sticky hands. It is tedious to remove even larger plant debris, so try to avoid collecting it with the resin.

to mature plants rather than dried trim and leaf. Unlike the other methods, it is only capable of being made at certain times in the growing cycle and cannot be made from material that has been collected and stored. Removing the collected resin from the hands can be an involved task.

Having pointed out these shortcomings, hand rubbing can be used when the goal is a small amount of quality hash to be used shortly after it is collected. Especially when the leaves and trim aren't going to be saved, hand rubbing is a good way to salvage some of the THC before or during harvest and manicuring.

The amount of material collected through hand rubbing is dependent on timing and good technique but is likely to be less than an ounce per hour. It is best to collect for hash when the plants' stigmas have just started to turn amber as they reach full maturity, but before the leafy material has become brown or dry. The more dead or dry material, such as dead leaves on the plant, the more plant debris will be mixed in with the hash. If the plants are mature and have some dead or dried material, removing these leaves before collec-



Sticky resin built up on hands is rolled into a ball of finger hash.

Photo: Ed Rosenthal

tion increases the quality of the hash. Collection should not be done when the plants are wet from watering, as this increases the water content.

Removing the Resin

Scrape the collected material from your hands periodically. Another person can help, or you can do it yourself. Use a blunt-edged scraper such as a dull dining knife. If more resin is to be collected, leave a little on the hands. Another way to remove col-

lected resin is to rub the hands back and forth against each other, as if trying to warm them up. The resin forms into a roll.

After the material is scraped or rubbed off of the hands it is kneaded and rolled between the hands until it forms a ball. It can be worked by rolling it between your two palms. Work it for several minutes to warm it and squeeze out residual moisture.

Hand-rolled hash can be pressed further using methods described on the following pages, or it can be considered complete after it has been worked into a ball. It is better to use this hash soon after it is made rather than storing it. Because it contains fresh resins, high vegetative content, and water from the live plant, hand-rubbed hash is more vulnerable to spoilage. If stored, the best place for it is in an opaque container that is not made of plastic or rubber placed in the freezer. Parchment paper and silicone are excellent containers.

Using water to remove resin from the hands is counterproductive, since the goal is to remove as much water as possible. Instead of aiding in the removal of the resin, water promotes spoilage.

If hash shows signs of molding, such as an acrid or mossy smell, or grainy white lines appear within the hash, it is ruined and should not be used. These bacteria and molds are no good for you.

PRESSING AND STORING HASHISH

Pressing transforms the material both chemically and physically. The glands are warmed and most break, releasing the sticky oils that contain the psycho-

active cannabinoids, as well as the terpenes—the source of marijuana’s smell, taste, and personality.

Terpenes lend fragrance to the hash. Smells and flavors characteristic to hashish range from spicy or peppery to floral. Many terpenes are volatile at room temperature. When inhaled they contribute to the lung expansiveness (i.e., cough factor), as well as the taste. Aged kief is both milder in smell and flavor, and less cough inducing, because some of the terpenes, not the THC, have dissipated.

Releasing and warming cannabinoids exposes them to air. This has the beneficial effect of potentiating the THC through decarboxylation. Continued exposure to light, air, heat, and moisture leads to THC deterioration.

You can press hash manually or mechanically. Manual methods work well for smaller amounts. Mechanical methods use a press, which is fast, convenient, and efficient. This section describes the best manual methods and discusses mechanical pressing.

Shoe Hash

This pressing method lets you multitask. While you are busy doing other things, the hash is being inconspicuously pressed within your shoe!

Shoe hash is a low-hassle way to press a small amount of kief or water hash. A few grams, usually 5 grams or less, are bagged in tightly wrapped cellophane or parchment paper wrapped around the material several times. A piece of tape stops it from unfolding. Punch a pinhole through the package to allow trapped air to escape. Don’t use a plastic bag because the hash sticks to it messily. It is important for scientific as well as psychological reasons for the material to be securely sealed before it goes in your shoe.

DECARBOXYLATION EXPLAINED

In the growing plant THC is present in the form of THCA, also called THC acid. A carbonate molecule (COOH) is attached to it, which is also called a carboxyl group or acid. THC is only marginally psychoactive when a carboxyl group is attached.

Decarboxylation removes the carbonate molecule COOH by breaking its bond with the THC molecule. This occurs when material is subject to mild heat.

When the carbonate molecule bond with THC is broken, the COOH evaporates away as water vapor (H₂O) and carbon dioxide (CO₂), leaving the THC behind. This is sometimes called “potentiating” the THC because it becomes psychoactive.

The package is ready to place. Place it inside the heel of your shoe. Hard-soled shoes or boots are better for pressing than soft-soled shoes, such as sports shoes, which take longer to process the kief.

The heel's weight and pressure within the shoe, aided by body heat, presses the hash into a slab. The pressing takes 15 minutes to an hour of on-foot activity, but it benefits from additional wear.

Pressing by Hand

Pressing by hand is a method for transforming kief into hashish a few grams at a time. Fresh hand-rubbed resin is often pressed by hand, too.

While pressing by hand is convenient, since it requires no additional equipment, it takes considerable energy and the results are better with a practiced technique. Those unaccustomed to hand pressing may find it difficult to make the material cohere. The considerable work it takes to get well-pressed hash can easily result in sore hands.

This method works best using freshly sieved medium- to high-quality kief. If the kief contains a significant amount of vegetative material, it is harder to mold into hash and may not stick together properly.

To hand press, measure out a small mound of fresh kief that will fit comfortably in the hand. A few grams are usually the most. Work this material with one hand against the other until it begins to cohere into a solid piece. Then rub it between the palms, or between palm and thumb.

After 10 minutes or more of working the material it begins to change density. Dry, aged kief lacks some of its original stickiness and may take longer to stick together, but if it was stored properly it should coop-



Hash Joint.

Photo: Ed Rosenthal

erate, though it may require more kneading. When a piece of hashish has not been pressed properly, it crumbles easily at room temperature.

If the kief is particularly stubborn and won't stick together to form a mass, mildly heat it. Wrap the material in food-grade cellophane, ensuring that it is completely sealed and all the air is squeezed out. Wrap this package in several layers of thoroughly wetted newspaper or cloth or paper towels. Turning frequently, warm in a skillet that is set on the lowest heat. It doesn't need to be heated as long as with other methods because the only point of heating it is to get the material to stick together so it can be kneaded into a solid piece.

Another method is to wrap it the same way and press it for a few seconds on each side with an iron that is set on a very low heat setting.

Machine Presses

Making hash is a cinch with a mechanical press. Bookbinding presses, called nipping presses, can be used. Plans are available on the web for building a press using a hydraulic jack.

Hand-pumped hydraulic presses are a less expensive way to get a tight press. Another cost-effective method uses a vice grip, although it takes some adaptation. For small amounts, a pollen press can be used in conjunction with a handheld kief-collecting grinder. Kief is added to this small metal tube. The tension pin is placed in, and the pollen press is screwed shut. The next day, the kief has been pressed into a neat hash block. Many companies have similar presses now, including one made of stainless steel with a low-torque T-handle.



This heavy-duty unit presses large amounts of kief.

Photo: TrimPro

Storage

Once the hashish is pressed, it can be kept for months or possibly years, with little deterioration to its potency and flavor, with proper storage. A frost-free freezer is the best place for storing hash.

Metal, glass, or silicone containers are preferred for storage. Plastics and rubber are not recommended because the terpenes—responsible for the flavor and aroma of the hash—are somewhat volatile compounds that interact chemically with plastic or rubber, degrading both the hash and the container. However, this happens slowly under freezing conditions.

Over time, the outer layer of hashish oxidizes and loses potency. The inside, not exposed to higher levels of light and oxygen, remains potent. Studies suggest that dark-colored hash degrades more rapidly than lighter-colored hash. Remember that mild light, heat, moisture, and oxygen oxidizes the outside of the hash, destroying its potency.



Nothing sticks to NoGoo silicone containers. They are a must for storing and transporting concentrates.

Photo: NoGoo