



## **The Art and Science of Perfect Cannabis Curing**

Cannabis connoisseurs know that the key to unlocking the full potential of this remarkable plant lies in the art and science of curing. It's that unmistakable sensation when you touch the buds, feel their resilience, and savor their enticing aroma. It's the smooth, consistent burn that tells you this cannabis has been expertly cured. Sadly, such quality is often elusive on dispensary shelves. But the good news is that achieving it is well within your grasp, provided you follow the right process.

### **The Importance of Curing:**

In the realm of cannabis cultivation, one undeniable truth reigns supreme: the drying and curing process is the grand finale. Months of hard work and meticulous care can either be elevated or squandered during this critical phase.

### **Historical Evolution:**

Before the age of the internet, underground cannabis cultivators refined their craft through trial and error, relying on massive experiments and shared curing techniques. With the digital revolution came a surge in knowledge sharing. Today, as scientific research on curing gains momentum, mastering this practice has become essential for anyone aiming to produce top-tier cannabis.

### **Guide Overview:**

This guide is your ultimate companion, merging practical instructions, insider tips, and answers to your most burning questions. Drawing from over two decades of hands-on experience, experimentation, and analysis, we'll delve deep into the world of craft growers who handle anywhere from 10 to 200 pounds of cannabis at a time. While the art and science of curing are extensive, this guide is your trusted roadmap on this exhilarating journey.

### **Topics Covered:**

Our journey will take us through a plethora of topics, including biosynthesis, respiration, shelf life, aroma, potency, combustion, moisture content, relative humidity, water activity, enzymes, amino acids, aerobic bacteria, oxidation, polymerization, anthocyanins, terpenes, terpenoids, flavonoids, sugars, starches, chlorophyll, white ash, ethylene, ammonia, CO<sub>2</sub>,

water vapor, GLV's, aldehydes, hexanal, alcohols, esters, nitrogen, potassium, minerals, mold, mildew, fungi, moisture analyzers, moisture meters, and hygrometers.

### **Understanding Curing:**

At its core, curing cannabis is a gradual process of moisture removal designed to trigger enzymatic activity, stabilize water activity, and maintain moisture content.

### **Why Cure Cannabis?**

Biosynthesis in cannabis represents the plant's inherent capability to generate a wide array of chemical compounds, including cannabinoids and terpenes. Preserving and enhancing these compounds stands as a significant priority of the curing process. Curing serves a multitude of purposes, particularly when packaged cannabis undergoes an extensive journey through a complex supply chain or when you aspire to unlock the maximum potential of your harvest. The key motivations encompass prolonging shelf life, enhancing flavor and aroma, improving burn quality, and unlocking the potential for increased potency.

### **The Drying Process:**

While drying and curing are separate steps, they offer the highest degree of control and consistency when treated as distinct phases. Successful curing hinges on proper drying, with factors such as relative humidity, temperature, and airflow under your command.

### **Transition to Curing:**

Moving cannabis from drying to curing is a pivotal but often overlooked step. It necessitates achieving the ideal water activity, typically falling within the range of 0.62 to 0.64 aw (water activity).

### **Curing Cannabis:**

Once your cannabis reaches this coveted water activity range, it's time to place it in a controlled environment. While curing on the stalk is an option that can offer superior results, practicality often leads to trimming between drying and curing. Trimming at this stage is dramatically more efficient than after curing is complete. The choice of container, such as wax-lined kraft barrels, can also impact the outcome.

#### **Trimming:**

Ensure your trimming room has the same environment as the dry and cure space. A common mistake is leaving uncured flower in a very dry trimming room for several hours. This can over-dry the flower before curing commences.

### **Curing Environment:**

Maintaining a dedicated curing room with precisely 58% relative humidity and a temperature of 68°F is vital. These controlled conditions are the guardians of terpenes and enzymatic activity. Temperatures below 60F slow or halt enzymatic activity, while temperatures above 70F affect volatile terpenes and foster mold / bacteria growth.

### **Monitoring and Burping:**

A regular monitoring and burping regimen is essential, with the ultimate goal of achieving a final optimal water activity (0.58-0.62 aw). This process typically spans 10 to 21 days. Longer is acceptable but often impractical in a commercial setting.

### **Changes During Curing:**

Over the course of curing, your cannabis will undergo transformations. Some flower can transition from an initial hay or earthy scent to a sweeter, more enticing aroma by weeks two to three. The strong individual terpene notes of the early stage will convert to a melody of terpenoids as time progresses.

### **Quality Indicators:**

A finely cured cannabis product is distinguished by snapping stems, a gentle stickiness, a symphony of terpenes, long-lasting moisture, and a smooth, clean smoking experience.

### **Cured vs. Uncured Cannabis:**

Cured cannabis reigns supreme over its uncured counterpart, offering marked differences in aroma, flavor, and burn quality.

### **Enzymes in Curing:**

In the curing process, enzymes such as proteases, amylases, lipases, pectinases, and cellulases play pivotal roles in breaking down various compounds.

### **Respiration during Curing:**

Respiration refers to ongoing metabolic processes in harvested plant material. Similar to live plants, this process involves gas exchange, including oxygen consumption and carbon dioxide release. It influences the curing environment's gas composition, temperature, and moisture content. Respiration generates slight heat and affects chemical processes like cannabinoid and terpene conversion. Respiration also influences the development of aromatic compounds, such as terpenes, and can activate enzymes that improve taste and quality. Properly managing respiration is vital for achieving desired cannabis curing outcomes.

### **Gases in Curing:**

Curing cannabis can unleash a symphony of gases, including CO<sub>2</sub>, ethylene, volatile terpenes, water vapor, and even ammonia.

### **Effect of Moisture on Weight:**

Moisture content significantly influences cannabis weight. A sample with 12% moisture content will weigh more than an 8% moisture counterpart.

### **Oxygen in Curing:**

Oxygen, while both beneficial and detrimental in curing, provides fuel for aerobic activity while simultaneously posing the risk of undesirable oxidation.

### **Oxidation in Curing:**

Oxidation, the breakdown of organic compounds due to oxygen exposure, can be kept at bay by proper storage in airtight containers.

### **Polymerization in Curing:**

Curing also initiates polymerization, where smaller molecules combine to form larger ones, contributing to the flavor, aroma, and effects of your cannabis.

### **Simultaneous Drying and Curing:**

While some growers opt for a combined drying and curing process, it presents challenges in maintaining precise curing conditions.

### **Curing on the Stalk:**

Curing on the stalk is a practice championed for its benefits, especially in the pursuit of top-tier cannabis quality.

### **Causes of Bacterial and Fungal Growth:**

Improper drying and curing can invite bacterial and fungal growth, with molds being more prevalent than harmful bacteria. Conditions such as warmth and moisture favor mold growth, and common molds found on cannabis include *Aspergillus*, *Penicillium*, *Fusarium*, *Cladosporium*, and *Botrytis*. Adequate airflow is crucial to preventing harmful growth.

On the flip side, aerobic bacteria play a beneficial role in the curing process. They consume sugars and organic compounds in cannabis, releasing enzymes and enhancing flavor, aroma, and quality. Providing sufficient oxygen through proper airflow is essential for aerobic bacteria to thrive.

### **Cannabis Odor: Cat Pee Smell:**

The infamous "cat pee" smell in cannabis stems from the release of urea, a compound generated during the breakdown of amino acids. Elevated temperatures and excess moisture during curing can trigger this phenomenon.

## **Curing and White Ash:**

White ash is often considered a sign of quality cannabis, similar to the tobacco industry's pursuit of white ash. While curing won't guarantee white ash, certain factors influence it:

- **Complete Combustion:** Properly cured cannabis maintains balanced moisture levels for even and complete combustion, resulting in lighter-colored ash, similar to dry wood burning.
- **Combustion Efficiency:** Well-cured cannabis burns efficiently, producing hotter temperatures and lighter ash. Elements like nitrogen require specific temperatures for effective combustion.
- **Plant Material Composition:** The chemical composition of cannabis, including cannabinoids, terpenes, and other organic compounds, can influence ash color, with properly grown and cured cannabis typically producing lighter ash.
- **Chlorophyll Breakdown:** High levels of chlorophyll affect ash color. During curing, chlorophyll and other pigments in the plant break down, contributing to lighter ash.

Additional factors like grind size, potassium content, and the type of rolling papers can also impact ash color.

## **Understanding Flavonoids:**

Flavonoids, natural compounds found in various plants, including cannabis, play roles in pigmentation, UV protection, and defense against environmental stressors. While they contribute to taste, aroma, and color in cannabis, they don't directly cause the psychoactive effects attributed to cannabinoids like THC and CBD. Some common cannabis flavonoids include quercetin, apigenin, cannaflavins A & B, kaempferol, and luteolin.

**Preserving Terpenes During Curing:** Terpenes, aromatic compounds in cannabis, are sensitive to heat. To protect terpenes during curing:

- Keep flower as close to 60°F as possible, as terpenes can evaporate in warm temperatures.
- Avoid over-drying, maintaining a water activity of around 0.62 to ensure sufficient moisture for trichome protection.

**Terpenes vs. Terpenoids:** In cannabis discussions, "terpenes" and "terpenoids" are often used interchangeably, but there's a subtle difference. Terpenes are primary constituents of cannabis essential oils, providing aroma and flavor. Terpenoids are terpenes that have undergone chemical modifications, such as oxidation or rearrangement. Though the terms are often used interchangeably, terpenes are the primary aromatic compounds in cannabis.

### **Anthocyanins in Cannabis Curing:**

Cooler temperatures and altered light cycles can induce the production of anthocyanins, which can impart purple or blue hues to cannabis. While not a primary focus of curing, they can subtly affect flavor, aroma, and appearance.

### **Cut Grass Smell in Cannabis:**

The "cut grass" smell in cannabis arises from the release of organic compounds known as green leaf volatiles (GLVs) when plant tissue is damaged. This diverse group of compounds, is a mixture of six-carbon aldehydes, such as hexanal, and their corresponding alcohols and esters. This odor typically disappears during drying and curing.

### **Using Humidity or Moisture Packs:**

Humidity packs can aid in maintaining moisture levels in already properly cured cannabis. However, they should complement, not substitute for, proper curing practices. Not all moisture packs are created equally. The two most common primary ingredients are glycerin or salt. Packs containing glycerin tend to absorb terpenes.

### **How to Assess Water Content in Cannabis:**

To perfect the curing process, it's essential to evaluate the water content in cannabis accurately. There are three common methods for assessing this crucial factor: Moisture Content, Relative Humidity (RH), and Water Activity (aw).

#### **Moisture Content:**

Moisture content measures the amount of water or moisture present in cannabis and is typically expressed as a percentage of the total weight of the cannabis. It provides insights into how "wet" the substance is, indicating the quantity of water it contains. Ideally, cannabis should fall within a moisture content range of 10% to 12%. However, lab tests for potency often report moisture content around 6%, resulting from intentional overdrying to enhance potency readings (reducing water weight increases the ratio of active compounds).

Measuring moisture content typically involves two primary methods:

- **Moisture Meter:** This handheld device equipped with two probes measures the sample's conductivity.
- **Moisture Analyzer:** A more sophisticated device weighs the sample, heats it to a specific temperature, evaporates the water, and then measures the weight difference after evaporation.

While moisture meters are cost-effective, they tend to be less accurate due to fluctuations based on flower density and applied pressure. In contrast, moisture analyzers, although highly accurate, come with drawbacks such as cost, limitations on sample size, time

consumption, sensitivity to environmental conditions, and variance of standards. In practice, moisture analyzers can yield inconsistent results, even for the same sample, making them less suitable for optimizing the cannabis curing process.

### **Relative Humidity (RH):**

Relative humidity (RH) measures the level of water vapor in the air concerning the maximum capacity of air to hold water vapor at a given temperature. It offers insights into the moisture conditions in the surrounding environment. Various RH measurement devices are available, ranging from low-cost hygrometers to high-accuracy models. Common hygrometers can lose calibration quickly.

### **Water Activity (aw):**

Water activity (aw) provides a more precise gauge of "free" or "available" water within cannabis compared to moisture content, which encompasses both free and bound water. An ideal water activity range for most cannabis is approximately 0.60 to 0.62.

Water activity ( $a_w$ ) has a notable impact on the enzymatic activity of various substances. Some substances whose enzymatic activity is influenced by water activity include:

- **Chlorophyll:** Chlorophyllase catalyzes the hydrolysis of chlorophyll to produce chlorophyllide and phytol.
- **Proteins:** Proteases, for instance, are enzymes that break down proteins. Their activity can be affected by the hydration levels determined by  $a_w$ .
- **Starches:** Amylases are enzymes that break down starch. Water activity can influence the efficiency of this breakdown.
- **Lipids:** Lipases, enzymes that hydrolyze fats, can have their activity modulated by  $a_w$ .
- **Pectin:** Pectinases, which break down pectin during fruit juice extraction and other processes, can be influenced by varying water activity.
- **Cellulose:** Cellulases, which break down cellulose, can be affected by water activity levels.

Devices used to measure water activity include:

- **Capacitance Meters:** These devices measure the dielectric constant of the sample, which correlates with water activity.
- **Dew Point Meters:** They determine the temperature at which moisture in the sample condenses, a value related to water activity.
- **Electronic Hygrometers:** These devices employ humidity sensors to measure the relative humidity of the air above the sample, from which water activity is calculated.



- **Chilled Mirror Hygrometers:** By cooling a mirror until dew forms on its surface, these devices establish the temperature at which dew forms, providing insights into water activity.

For precise measurements, a high-accuracy handheld electronic hygrometer is often the most cost-effective choice. It is advisable to use at least two such devices for cross-referencing. Accuracy of +/- 1% is recommended.

### **Importance of Water Activity:**

Understanding water activity is paramount for preserving the quality of your cannabis product. Here's why:

- **Microbial Growth:** Water activity significantly influences microbial growth. A water activity level exceeding 0.65 can promote the growth of mold and bacteria, posing health risks and compromising the cannabis's quality.
- **Terpene and Cannabinoid Preservation:** Water activity plays a crucial role in preserving terpenes and cannabinoids. Levels that are too high can lead to terpene loss, while excessively dry conditions can degrade cannabinoids.
- **Smoke Quality:** Properly cured cannabis, with the right water activity level, results in a smoother, more flavorful smoking experience.

### **How to Measure Water Activity with a Hygrometer:**

- Place the cannabis sample and a hygrometer in a sealed container to prevent moisture exchange.
- Allow the sample to equilibrate at room temperature for up to 24 hours.
- Record the relative humidity reading on the hygrometer.
- Calculate water activity using the formula  $aw = RH/100$ .

**Note:** To prevent microbial growth, avoid allowing the sample to exceed 65% RH for extended periods. Accurate water activity measurements are crucial for maintaining the quality of your cannabis throughout the curing process.

### **Conclusion:**

In the intricate world of cannabis curing, science meets artistry. By grasping the significance of water activity, selecting the right curing method, and measuring water activity with precision, you can elevate your cannabis to a realm of unparalleled quality. With patience and dedication, you can truly master the art and science of cannabis curing, delivering an exceptional cannabis experience like no other.



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