



**YAMATO**

Transforming Cannabis and  
the Cannabis Supply Chain

# Transforming Cannabis

Learn how and why spray drying is fundamentally transforming the cannabis industry + how your business can grow into a leader and watch profits bloom.

About 2,500 years ago, there was a funeral.

Someone died along the northern route of the silk road and was buried in the hard, rocky ground of Jirzankal Cemetery. It's an ancient site on the Pamir Plateau in what is now China's Xinjiang region - a locus along the trade path connecting the extremities of China on the east to Greece in the west and many places along the way.



The ceremony went as they all did in this part of the world at this antique time. The body was entombed and the community began its funeral rituals. Stones were heated in a fire, then placed in a wooden brazier. Beneath the stones were the dried leaves and flowers of a particularly potent variety of cannabis plant. Experts say the smoke was a central part of the funeral rites and maybe used to communicate with nature or spirits or the dead.

Somewhere along the silk road cannabis grew naturally or was sown. And it was a desirable product, making its way through the trade network alongside early staples like wheat, barley, and millet.

But even then, thousands of years ago, traders struggled with some of the same challenges cannabis businesses today do.

The difference is today - **right now** - there's an opportunity to make the biggest step forward in cannabis product development, manufacturing, and distribution ever.



In this article, you will learn about the challenges other businesses in the cannabis supply chain face (since you're already well aware of your own challenges) and how spray drying cannabis oil to create cannabis powder is the biggest development and opportunity for cannabis businesses in the history of the plant.

### **You'll learn about:**

- Challenges with cannabis distribution
- Challenges with cannabis product development
- Challenges with cannabis product supply

### **You'll also learn about:**

- How spray drying cannabis works
- The benefits of spray drying cannabis (why CBD powder and THC powder are better products)
- How spray drying cannabis can help every business in the cannabis supply chain grow quickly, from growers to manufacturers, distributors, and retailers
- Why consumers want more cannabis powder and products made with it on shelves



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No matter where you are in the cannabis supply chain, getting an early advantage with cannabis powder is going to translate into financial success.

**How much success depends  
entirely on how early you start.**

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# Challenges with cannabis distribution



The clock is ticking from the moment a cannabis plant is harvested. Two thousand years ago along the silk road, traders did their best to store dried cannabis buds in cool, dry, dark places for the trip east. But it was a difficult thing. Even with modern breeds of cannabis plant and ideal storage conditions, dried cannabis is only good for about six months.

That's not nearly enough time for traders in antiquity to bring the potent and desirable Pamir Plateau strain to consumers in the east. So traders brought seeds. It may not seem like much in the age of shipping containers and drone parcel delivery, but there was a time when transporting seeds to sow great distances away was a revolutionary idea. By transporting seeds, traders made better use of their limited space and increased their profits.

**You face the same challenges**  
with cannabis product distribution today.



Every product you make takes up space, and getting it to the next business in the supply chain is a logistical challenge.

Think about the back of a transport truck in terms of dollars of active ingredient that consumers can metabolize per square foot. To get the most value out of a cannabis product, the back of that truck needs to be filled with as much consumer value of product as possible





## How does that relate to the cannabis products

you currently foot the bill to transport?

- Dry cannabis buds don't weigh much, but they take up a lot of space and need good environmental controls to avoid spoiling. Smoked cannabis has bioavailability of about 25% according to studies. The cost of transportation eats into your profits. The cost of spoilage eats into your profits. And you transport 75% more mass than you need to.
- Cannabis oil has a longer shelf life and can be stored for up to 2 years under the right conditions. It is still heavy. And it's not the ideal form for the human body to metabolize. The oil particle size is large. And bioavailability for consumers is about 5 - 10% according to studies. So you transport a lot of weight that consumers don't get value from.

You only have so much space. Storage space in your warehouse. In your vehicles. In your retail location. And to maximize profits, you have to use that space intelligently.



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**Spray dried cannabis powder weighs less and reaches bioavailability of 100%, so everything you transport is more valuable to consumers.** How? It's all about reducing particle size. The particle size of CBD oil is generally around 2000 micro meters. Some spray drying processes reduce that size to less than 90 micro meters. At that size, the body absorbs every bit of active ingredient.

**Spray dried cannabis powder lasts longer in storage.** Studies have shown CBD powder and THC powder get about an extra year of shelf life than their oily cousins. Distribution becomes even easier - spoilage is less of a concern and you can sit on supply without worrying about product loss when consumer trends fluctuate as they always do

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# Challenges with cannabis product development

## It's tough to make each dose consistent, especially in edibles and beverages

Consumers want experiences that are:

- Predictable
- Consistent
- Repeatable

The **edibles** you produce do that pretty well. But there's **one factor that limits the consumer base for your (and every other product manufacturer's) edibles**. Edibles take a long time to kick in, and the intoxicating effects last a long time.

Cannabis edibles are excellent delivery methods for CBD and THC. But because they take an hour or more to metabolize in the body; because the peak effect might not hit for three hours; because they keep users intoxicated for up to six hours, they aren't casual use products. They have a very specific audience.

Cannabis edibles crafted using powder instead of oil are attractive to a whole new consumer group because the effects are:

- Faster-acting
- Highly predictable
- More consistent than any alternative
- Repeatable with a high degree of accuracy

And the duration of intoxication is shorter because of the way the THC or CBD is absorbed into the body. The small, water-soluble particles of cannabis powder are absorbed into the bloodstream from the digestive tract, through the skin under the tongue. The body doesn't need to metabolize it the way it does with cannabis oil products.

That means edibles made with spray dried cannabis powder have a predictable, fast onset effect at 20 minutes and a similarly predictable offset based on the dose. And the bioavailability it provides to edible products is higher than oil (some processes have been shown to achieve 100%).



## Cannabis beverages are chunky and hard to get right

Developing good cannabis beverages with cannabis oils is hard. Oil and water don't mix. So you end up with a strange, chunky, unattractive product. But consumers want cannabis beverages. And likely they'll be a standard product in the next five years, alongside bottles of beer behind the bar.

Because cannabis beverages made with cannabis powder are unlike anything widely available on the market right now. They skip the chunky, oily, bitter flavor. They go down like a normal beverage, and they still have that fast-acting onset.



The quicker the effects of cannabis hit, the quicker they subside. Delivering THC or CBD in beverage form in a social setting is the ultimate coup for your business. Imagine:

- Consumers go out for a night on the town
- They know when they plan to go home
- And they know exactly how long the effects of your CBD beverage will last
- So they choose your beverage over alcohol because they know exactly when they can drive home safely

It's the holy grail of the social culture. Predictable intoxication.

**Spray drying cannabis oil makes mass-market cannabis beverages attainable for product manufacturers.**





# Challenges with cannabis product supply



## Managing inventory is tough

In every industry, inventory management is a science. But that doesn't mean it's simple. And that doesn't mean there isn't space for improvement.

Spray drying cannabis makes managing product supply easier for distributors, product manufacturers, and retailers.

- Right now you maintain detailed, short term records on items in inventory. Some estimates say that as much as 15% of cannabis products spoil somewhere along the supply chain before being purchased by a consumer. **By granting CBD and THC longer shelf life via spray drying, you reduce the potential the product will go bad before a consumer gets their hands on it. It's an instant improvement to your profits.**

## It's difficult for smaller brands to source enough quality cannabis when competing with larger producers

Smaller cannabis brands have fewer resources - less storage space and distribution capacity. Less buying power when stacked up against the large, consolidating brands.

Smaller brands can get more mileage out of each bit of storage space, every square foot in the delivery truck, by working primarily with cannabis powder.

- It can still be put into capsules like your THC oil or CBD oil
- It can be compressed into tablets or chewable vitamin-style tabs (because that excessively bitter taste isn't present in powdered cannabis)
- It can be dissolved into your existing edibles recipes without any significant change in your infrastructure (in fact you can probably reduce steps in your process and reduce overhead costs)

With the longer shelf life of powdered cannabis, your smaller brand can also purchase larger volumes when they are available and you don't have to worry about the product spoiling before you can get it to retail. It gives you more freedom to manage your ingredient supply comfortably.

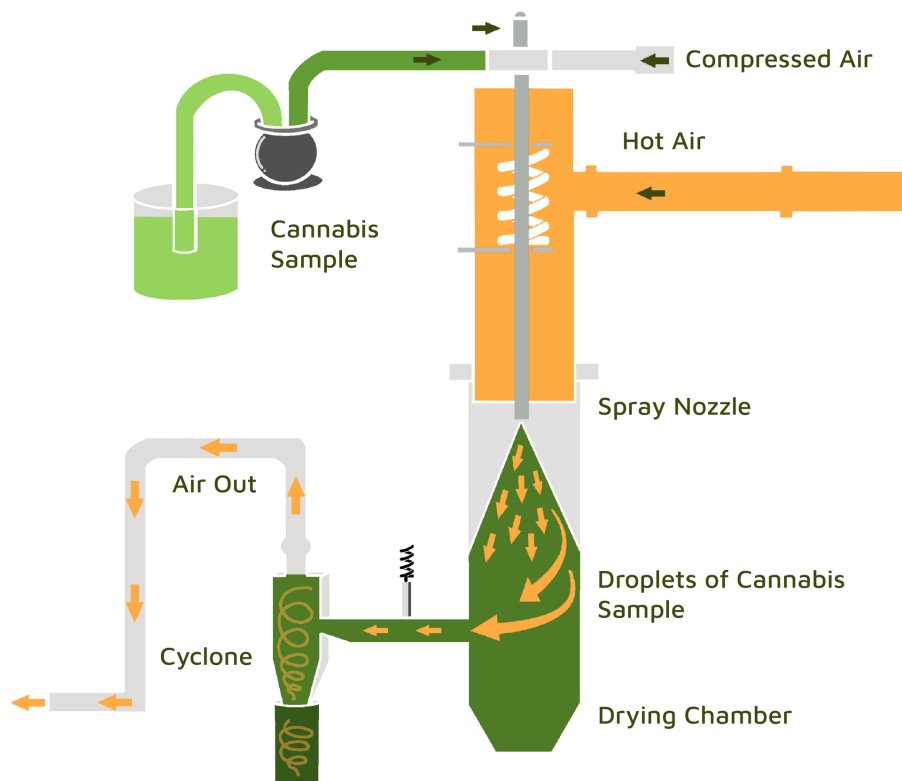


# How spray drying cannabis works

The spray drying process begins with a cannabis oil feed. There are a handful of ways to get your cannabis oil ready for the reaction tank at the start of the process. Commonly, manufacturers create nanoemulsions by blending cannabinoid oil, emulsifier, filter agent, and water. After preparation, the emulsion is ready to spray dry.

The emulsion enters the spray dryer system, is gently heated, and converted to small droplets (atomized) with the help of pressure at the spray nozzle. The particles here become micro-sized and, at that size, they dry quickly with very little additional heat applied.

**This is where Yamato lab-scale spray dryers do their best work with cannabis**



The design and quality of some spray dryers leave particles exposed to heat for longer than they need. With a cannabis product, this activates and wastes the active ingredients consumers want.

Short temperature exposure is a good thing. The less heat those important THC and CBD particles are exposed to, the better value each product produces through the supply chain.

As particles dry and become powder, they are pulled out of the drying chamber to the final storage vessel by cyclonic force.

**CBD and THC are now more uniform through your product. Your product is going to last longer on shelves by up to 200%. No cannabinoids are wasted preparing the powder.**



# The benefits of spray drying cannabis



Spray drying cannabis to create cannabis powder has far-reaching benefits for every point in the supply chain.



For growers:

- Do more with your harvest by refining it into a product more manufacturers are going to want - and will pay more for.
- Sell directly to product manufacturers or retailers, rather than distributors, keeping more of the profits for your business.
- Make a name for yourself as a visionary and industry leader.

For distributors:



- Get contracts in place for a product that's going to sell an explosive and increasing volume in the immediate future.
- Invest in technology and expand into in-house product manufacturing to keep more profits for yourself.
- Position your brand as a bold leader in the industry, willing to jump on

For product manufacturers:



- Make a product that works better with your edibles and cannabis beverages than the oils you use now.
- Reduce the logistical costs of making your products - CBD powder weighs less but delivers more effects to your customers.

For retailers:



- Carry the products informed consumers know about early.
- Stock products regular customers will make staples as soon as they know about them.
- Establish your retail locations as places consumers can get cutting edge, high-quality products
- You already have the relationships in place - maybe it's time to expand into product development and carry in-house artisanal CBD powder and THC powder varieties.





# How spray drying cannabis can help **every business in the cannabis supply chain grow quickly**



Consolidation is happening in the cannabis industry across the US. Whether you're a grower, distributor, product manufacturer, or retailer, digging into cannabis powder products helps you grow quickly and gives you a strong value proposition for two primary outcomes:

- Maybe you want your business to be acquired, so you can walk away with a healthy balance in the bank and the time to explore other interests. Maybe it's the financial freedom to spend more time with your family. Either way, an early foothold on powdered cannabis makes you a more attractive target for acquisition.
- Maybe you want to compete with the larger businesses as they acquire more of the small and medium-sized growers, distributors, product manufacturers, or retailers. The growth potential with cannabis powder is explosive, but refining your process will take time. To compete as other businesses grow, you have to start early. But make no mistake - cannabis powder will be one of your strongest weapons as you battle the larger brands

## **You're a large brand with lots of resources** and a big piece of the market already. What about you?

Large brands will produce and sell cannabis powder, and Yamato spray dryers are the best lab-scale spray dryers to help them refine their process and develop new formulations.

- Invest in developing your cannabis powder products now so you can outcompete the other large brands going after this market. They're doing it. We know because we already partner with some. And we love healthy competition, so we want to help you compete too.



# Why consumers want more cannabis powder and products made with it on shelves



Consumers want cannabis powder for the same reason they want anything. They like choice. They like variety. They like new. They like control.

Cannabis powder touches all the right points and opens up a ton of possibilities for consumers.

Like the cannabis infused beverage they can drink at the start of their night out, but be completely sober an hour later.

Like a simpler way to make their own edibles at home.

Like a more comfortable, predictable experience with capsules.

Like a product they can purchase and never worry about spoilage.



Imagine the transformative possibilities of cannabis powder products for your business.

- A cannabis hot chocolate packet that dissolves just like any hot chocolate packet and has no trace of bitterness.
- Cannabis coffee sweeteners.
- Long-lasting cannabis pills that can sit in a medicine cabinet for years.
- Cannabis cinnamon sugar that's used as a dessert topper.

The possibilities go on and on, and you can take the lead in the industry by choosing to be an early adopter today.

It will transform your business the way transporting cannabis seeds made the fortunes of traders thousands of years ago, and we can help.



Our spray dryers are recognized as the best in the industry for lab-scale product development, proof of concept, process verification, and product testing. We're already helping other businesses find the right model for their new products. **We can help you too.**

Contact us today to put your business on a transformative trajectory.

Together, we're transforming cannabis.



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