YOU CAN MAKE MEAD!

everything you need to know, condensed and visualized by long-time homebrewer BC Phillips

with photos by Charlie Ludden & doodles by Justice Carson

Featuring a visual guide to home mead making and 20 trusted recipes with complete instructions!

For my little family, who are so patient with my many time-consuming hobbies.

Thank you also to Jake, Larry, Matt, Renea, and Will for your help in reviewing the information in this book for accuracy and clarity. You are each incredible.

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INTRODUCTION

Taste the spring. Savor the fall.

Wine made from honey offers an experience unique from any other fermented drink. Bees harvest rich nectar and transform it through a miraculous process to become honey. Yeast, and sometimes other microorganisms, then convert the sugars in the honey into alcohol – and often alter or enhance the delicate floral elements as well. In the end, we are left with the very essence of the flowers. Eucalyptus blossoms offer cooling notes of menthol. Orange blossoms whisper tangy hints of citrus. Buckwheat honey is bold, viscous, malty, and earthy.

Making mead gives us a fascinating insight into the very nature of our honey. Devoid of the rich sugars, the veil is lifted from the subtle nuances. We experience the flower more freely and focused.

I first found my way into homebrewing around 2010. I had been on several wine-tasting adventures, including some magnificent trips through the hills of Santa Maria Valley. And I found myself wondering – could I do this at home? Could I make intense, tannic, and rich wines from items found at my local grocery store? For many years the answer was “no, absolutely not.”

I began with what are called “country fruit wines.” These are wines made with table grapes or other fruits, usually bolstered in alcohol by volume by bulking up the sugar concentration with cane sugar. They are usually thin, cidery, and stinging with heat from fusel alcohols. Learning to balance country fruit wines takes much practice. But for a young man in his twenties – they did the job. Some recipes could produce 5 gallons of drinkable wine for less than 50 cents a bottle! Can you blame me for finding a way to gulp those down?

Years later, and with a more practiced palate, I had finally “mastered” country fruit wines. Much of my growth came from studying the best practices of winemaking great Jack Keller. Keller, who sadly passed away in 2020, had such an impressively keen understanding of how fermentation impacted individual ingredients – as well as the artful balance that takes a wine from good to great. I learned so much from him.

After about a year-long hiatus from homebrewing, I wanted a new challenge. I had dabbled in mead in the past with poor results. And, sadly, the commercial meads I had tried were also substandard. I thought, “maybe I don’t like mead?” So I set out to learn what makes a good mead. I wanted to understand everything about it, from the makeup of the honey to the magic performed by the microorganisms that do the work to how to find equilibrium across styles in balancing acid, tannin, and sweetness.

That journey led me to eventually document my experiments on a YouTube channel. The channel, called Doin’ the Most, eventually garnered interest from beginner and intermediate-level meadmakers and other homebrewers. Through the opportunity afforded by the success of the channel, I was able to test many different mead styles and ingredients. And I ended up perfecting quite a few recipes along the way.

But, why mead? What intrigues so many home-brewers about the world's oldest boozy beverage?

Mead is an alcoholic drink created by fermenting honey with water, sometimes with various fruits, spices, grains, or hops. The alcoholic content ranges from about 3.5% to more than 20%. The defining, and perhaps most alluring characteristic of mead, is that the majority of the beverage's fermentable sugar is derived from honey.

Mead may be still, sparkling, and anywhere from dry to sweet. It is often said that mead was the first alcoholic beverage. It isn't difficult to imagine ancient humans coming across a beehive in a tree trunk that had been saturated by rain and fermented by naturally occurring yeasts. After drinking the sweet boozy honey water, who would not want to learn how to make it on their own?

Mead was produced in ancient history throughout Europe, Africa, and Asia. Pottery found in northern China dated from over 9000 years ago has been discovered to have residue chemically consistent with honey and other organic compounds from fermentation.[1]

Mead is alleged to have been the preferred alcoholic drink during Ancient Greece's Golden Age. Hispanic-Roman naturalist Columella, who wrote often on the topic of agriculture, penned a recipe for mead in his writings around the year 60 CE:

"Take rainwater kept for several years, and mix a sextarius of this water with a pound of honey. For a weaker mead, mix a sextarius of water with nine ounces of honey. The whole is exposed to the sun for 40 days, and then left on a shelf near the fire. If you have no rain water, then boil spring water." [2]

Modern practices are far more refined. A traditional mead can be made in a gallon glass container with three pounds of honey, some spring water, and wine or champagne yeast.

And with a little knowledge, forethought, and insight into the biological processes involved, you can make mead at home! Are you ready? Let's do this!

1. McGovern, P. E.; Zhang, J; Tang, J; Zhang, Z; Hall, G. R.; Moreau, R. A.; Nuñez, A; Butrym, E. D.; et al. (6 December 2004). "Fermented beverages of pre-and proto-historic China". Proceedings of the National Academy of Sciences of the United States of America. 101 (51): 17593–8.
2. Columella, 60 AD De re rustica

CHAPTER ONE

THE BASICS

Homebrewing can be daunting at first: the equipment lists, the risk of wasting good ingredients on an undrinkable batch, and even myths of homemade alcohol causing blindness and death. The comforting truth is, homebrewing mead, wines, and ciders is not all that daunting. And even if your batch comes out sideways, it's a small lesson on your route to the next batch. This is especially true if you choose to begin with one-gallon batches. For the cost of a couple pounds of honey, a packet of yeast, and some vital yeast nutrients, you can be on your way to learning how to make delicious drinks at home.

But you may be wondering – why start making mead at home? Why brew up something no one ever even sees on wine shop shelves? Well, the four-fold answer is simpler than you might think. Let's make the case:

Tasty mead *can* be hard to make

My favorite reason to recommend mead as an introductory homebrewed beverage is because it makes for great practice. Mead requires attention to detail, developing your nose and palate, and **patience**. Once you've really mastered how to make a great batch of mead, no other brew out there (even beer!) will seem stifling in the least.

Mead offers lots of variety

Later on in this book we'll review the various styles of mead out there: fruited, spiced, hopped, heavy, light, and more. There is more flexibility and creativity afforded by mead than any other brewed beverage out there. Mead can be anything it wants: a wine, a beer, a seltzer-style drink, or just what the mead gods intended: fermented honey balanced only by water minerals, yeast magic, and time.

It's hard to find good mead

Some amazing meaderies exist all around the world. But access to their delightful delicacies often limits us from enjoying truly great meads. Since mead is tough to find on the wine shop shelf, or even in restaurants, we might as well make our own. This way, we get exactly what we want.

It's fun!

Like any hobby, it pays for itself in the joy it brings. Whether you enjoy the creativity, the procedure, the buzz, or all three – homebrewing can be a lot of fun once you dive in head-first. Don't let the anxiety of messing up get to you. Relax and enjoy the hobby!

Meadmaking can be as simple as you'd like it to be. The basic procedure involves:

- Preparing the ingredients and sanitizing gear
- Mixing up the must
- Fermenting the sugars into alcohols
- Racking from the lees for aging, and
- Bottling the mead for consumption or long-term storage

Branching out from the core basics can yield increasingly complex practices and products. A beginner might start out with a little honey mixed into a half-gallon of blueberry juice with some baker's yeast, while the advanced meadmaker might be inspired to pour a gallon of honey onto 50 pounds of crushed blueberries and dose the thick must with enzymes and exacting nutrient additions.

Both are acceptable and neither is necessarily the "right" way of doing things. One might produce a bigger, bolder, and more complex product. But at the end of the day, making what you like to drink and being proud of your own handiwork is the truest essence of your endeavor. And not everyone has the finances or capacity to make giant artisanal batches.

In this book, we try and ride the line between the two schools of thought. So, you will see us recommending brewing in large batches if you can. But also, we try and keep ingredients lists short and on the inexpensive side where feasible. Every recipe included at the end of this book can be scaled up or down with simple math. Our hope is that you have fun, learn a lot, and become inspired to leap off into your own recipe builds!

If you're totally brand-new to homebrewing, the vocabulary and gear list can feel daunting. Let's take a look at some common words and phrases you'll see throughout this book.

Note: At the end of this book you will find a glossary of terms related to appearance, aroma, and flavors in mead.

Must
The liquid to be fermented. In the case of mead, this is a blend of honey and either water or juice.

Wort
Another term for liquid that will be fermented, but used to describe the “must” prepared for beers and braggots. Wort typically implies the inclusion of malt sugars.

Specific Gravity
A reading taken by a hydrometer or refractometer that reflects the density of the must. Alcohol is less dense than water, so as the sugar (dense) is converted into alcohol (less dense), the measure of the density of the mead goes down. A simple calculation of the difference between Original Gravity and Final Gravity will tell you the ABV of the beverage.

Rack
To transfer the mead from one vessel to another. Usually this action is performed by siphoning or otherwise gravity-transferring the mead to minimize exposure to oxygen.

Carboy
A glass vessel used to ferment and age mead. Typically sold in 1, 3, 5, or 6-gallon volumes. For carboys larger than one gallon, look for well-made Italian glass carboys, which tend to have the best integrity over cheaper carboys.

Siphon
A gravity-fed system for racking mead from one vessel to another. A siphon uses vacuum pressure to initiate the transfer, then gravity to do the rest of the work. Typically, siphons are started by using suction (in the case of a standard racking cane) or pump action (in the case of an auto-siphon).

Lees/Trub
The bulk sediment (yeast, proteins, pectins, etc.) that settles to the bottom of your brewing vessel or, if not properly clarified, your bottles.

Primary
The initial stage of fermentation where the bulk of the sugar-to-alcohol conversion is performed.

Secondary
The second stage of “fermentation” – though, depending on the recipe, no sugar-to-alcohol conversion may occur in secondary. Colloquially, “secondary fermentation” refers to the stage after racking off the lees from primary.

Tertiary
Occasionally another racking may be performed after secondary. Some people will refer to this stage as “tertiary.”

Pitch
To add an ingredient to a must – usually referring to the addition of yeast to inoculate the batch for fermentation.

Dry-Hop
An addition of hops that are added raw, rather than boiled. This method is employed as a way to introduce the more delicate flavors of a hop, as well as a “fresher” hop character.

No-water
Perhaps a bit misleading at first, read this as if there is an unwritten “added” at the end. This term is used to describe meads made with no added water beyond what is brought in by fruit inclusions. A “no-water added” mead is typically made with honey, fruit, and enzymes to break down the fruit. They are usually high in acid, tannin, and final sugar content.

BASIC GEAR RUNDOWN

There are so many new terms and best practices to keep in your brain. Then you hop on the online marketplace to browse for supplies, and it is all so overwhelming.

We've all been there. When I started brewing more than a decade ago, I had no clue what to look for or what things were called. And in those days, web forums and books were often the best resources. Fortunately, now YouTube and blogs have taken off, so information is more accessible. But for the newer brewer, a cheat sheet is always handy. For that purpose, we developed this super simple homebrew starter shopping list so you can get your brewventure started right now!

Here's everything you need so you can jump into homebrewing your own meads:

Hydrometer
We place this at the top of the list because it is the #1 tool for you to get to know your brew. Learning how to read a hydrometer will allow you to see some clutch pieces of information: the potential alcohol content, the progress of your fermentation, and residual sweetness left behind (if any). The hydrometer is crucial in homebrewing because it is like a gauge for diagnosing what's happening in your brew. Think of it like a thermometer, barometer, or any other type of weather diagnostic tool.

The more you know about the unique environment within your fermentation vessel, the better you can hone your brews – and your skills at brewing.

Carboys
Speaking of vessels, you need something to brew in! Most homebrewers these days use glass jugs and carboys. You most often find them in 1, 3, 5, and 6-gallon volumes. New brewers typically start in one-gallon batches. However, I tend to recommend five-gallon batches as a starting point – but one gallon is a great way to get started. We'll do a deep dive on five-gallon batches in Chapter Six. You can start out fermenting in food-grade buckets (I did), but as you become more cognitive of, and sensitive to, oxidization issues in your meads, the more you'll want to limit "headspace." With their narrow necks, jugs and carboys restrict the exposure of your mead to the air. Less oxygen in contact with your mead means less chance of oxidization in your fermentation vessel before bottling.

Buckets
When it comes to primary fermentation – especially when you're working with solids, like fruit or spices – fermenting in a bucket provides ample headspace. For many meads, fermenting primary in a bucket and secondary in a carboy makes the most practical sense. A bucket is also great for holding sanitizer to soak tools.

Airlocks
The best way to limit outside air (and pests) getting into your brews is to keep them under airlock. Bubbler airlocks use sanitizer or vodka as a "valve" between the must and the outside air. CO_2 can bubble out, but nothing else can get in. They do come with some maintenance needs, though – a bubbler should not run dry. So you need to keep an eye on it and top up the airlock when needed.

For this reason, I've switched to silicone bungs. These (often medical-grade) airlocks are molded, breathable, silicone valves that fit into the neck of the carboy. I've found them to be just as reliable as bubblers without any of the headaches of maintenance. Opinions of these airlocks vary widely across the internet, though, as some folks claim they are actually too oxygen-permeable for long-term aging. I have not found this to be the case, but your mileage may vary.

Campden Tablets/K-meta
This chemical comes in either pill-shaped tablets or powder form and is made of potassium metabisulfite, a sulfur-based product used primarily to stun wine, cider, and mead. They can kill bacteria and inhibit the growth of most wild yeasts. Campden tablets allow the new homebrewer to measure small quantities of potassium metabisulfite easily, but powdered K-meta makes for more precise

dosing. Many meadmakers recommend sanitizing the must with K-meta 24 hours before pitching the yeast, then again just before bottling. These steps are not necessarily required, but are a useful control mechanism for the homebrewer who is learning the process.

Star San
This brings us to acid-based sanitizers like Star San. Star San is a self-foaming acid sanitizer ideal for brewing and other food and beverage equipment. It is an extremely effective bactericide and fungicide made from a blend of phosphoric acid and dodecylbenzene sulfonic acid. It is cheap, effective, and most importantly – safe! Anything that will come in contact with your mead must be sanitized to prevent microbial infections that could turn the must into something dangerous (or gross). Star San is the most widely used product, but other homebrew sanitizers are out there as well, like Iodophor. Sanitizing solution is a must-have for homebrewing!

Racking Cane and Tubing
Your racking system is how you get your brew from one container to the next. Remember the old TV shows where someone would siphon gasoline from a car? It is the same idea! The racking cane is a rigid tube that clips onto your brewing vessel. The transparent tubing, typically medical-grade vinyl hose, attaches to the top of the cane. Don't skimp here – get a stainless-steel racking cane. I've blown through enough plastic ones early on to have more than paid for stainless. You can start your siphon with a little mouth suction, but some people prefer an auto-siphon.

Bottling Wand
Once you're ready to bottle, you'll want some serious control over how the mead gets from the carboy to the bottles. The bottling wand attaches to the end of your racking tubing and has a valve at the end. When pressed against the bottom of a bottle, the valve opens, and your brew flows delicately into the bottle. Just lift when the bottle is full and move onto the next bottle. It's that simple!

Brushes – Bottle and Carboy
Make sure to pick up some brushes for bottles (if you're recycling) and your carboy. It is challenging to clean the insides of these vessels. But with a soak in a brewing cleaner (or sometimes even Star San) and a little scrubbing with the proper brush, you'll have clean glass in no time!

Bottle Corker
You've picked up this book because you're interested in making mead – which means you'll probably be bottling in wine bottles. Make sure you have a great corker on hand for this process. You want the cork to be firmly seated inside the bottle all the way into the neck. My favorite style of corker is a small hand corker, but there are large floor models as well. Just sanitize your corks briefly, dry with a fresh paper towel, place them in the corker, and cork away.

Optional Additional Items

Bottle Capper
Particularly if you plan to carbonate and bottle-condition, you'll probably want a crown capper. They make hand models, but I prefer a bench capper because of the added control. Bench cappers have a broad base meant to be bolted down to a workbench. However, you can easily attach it to piece of 1" plywood as a base by boring out a recess for the bolt heads on the bottom.

Bottle caps are cheap, and reusable bottles are aplenty – so this is a great cost-conscious option if you plan to drink your brews sooner than later. Stick to corks if you will be bottle-aging an uncarbonated mead for a while.

Funnel
A wide-necked funnel can make it a lot easier to get honey, juices, grains, hops, and other fermentables and additives into the neck of your carboy. I went years hemming and hawing over purchasing one and, now that I have one, I can't imagine going back to a world without.

Yeasts

Some folks, myself included, like to keep certain yeasts on hand. My current lineup includes Lutra kveik, D47, and EC-1118, but I've also had Premier Rouge or RC212 on hand for fermenting fruity reds. I also almost always have a few kveik ale yeast strains handy in case I get a hankering for a yeast with a lot of character. It's nice to be able to grab a packet from the fridge and ferment – rather than have to run down to the brew shop or wait for an online delivery.

Scales

Scales, including sub-gram and larger scales, can be tremendously helpful. They ensure accuracy in measuring ingredients, like when weighing honey and other additives. During balancing, a sub-gram scale increases your precision in getting flavors "just right." When stabilizing a mead, you can wiegh out just the right amount of stabilizers to hit the perfect parts per million (PPM) of sulfites or sorbate. Or, say you're carbonating a mead with bottle conditioning -- using a scale will ensure you're adding just the right amount of priming sugar. A scale gives you consistency, reproducibility, and the comfort that your recipe is as exact as possible.

CHAPTER TWO

FERMENTATION MAGIC

Fermentation is as complex as it is rudimentary. There are a lot of moving parts to ensure everything goes right. But in its heart, it's a fairly simple biological process where you'll usually spend a lot of time waiting. Getting started can feel like a complete whirlwind from the first moment you type it in the search bar: "How to make mead at home." Never fear, we've got you covered with this simple introductory primer.

Fermentation consists of four phases we're going to discuss here: Preparation, Brewing, Primary, and Secondary. For still products, you may also need to stabilize the mead.

Preparing to Brew

Fermentation begins with deliberate preparation. What are you going to brew up? A blackberry melomel? A hazy IPA braggot? A lemongrass metheglin? What's your recipe? And do you need to do anything to get your ingredients ready before you ferment them? Preparation is key!

Your prep may include maceration, which is the process of putting the fruit in a cool environment with an enzyme for a few days or even a week before starting fermentation. This can encourage color extraction, and is generally done with crushed fruit soaking in its own juice or in water. The enzyme used is typically "pectinase," or "pectic enzyme." Pectic enzyme is a powdered enzyme which physically destroys pectins. Pectins make up the "fleshy" part of most fruits. It works great to break fruit down for improved juice extraction – and particularly in fruit wines and ciders, it can lend to a product that clears easier. Pectin haze can be a frustrating problem. So, if you've got pectin-rich fruit, use some pectic enzyme!

Your prep may also include a yeast starter. While not absolutely necessary, it can help to ensure good yeast counts and a healthy colony. A yeast starter can be as simple as slowly introducing some must to your yeast bit-by-bit and whipping in some oxygen. Or, it can be as complex as using a rehydration nutrient like Go-Ferm and a stir plate to really whip it into action.

It's important to plan for your preparation – and how much time you'll need. Preparation can impact when you need to mix up your must. For example, if you want to do a week-long cold maceration to get lots of red coloration out of some blueberries, you have to budget time *a week later* to mix up your must. Or if you're making beer – a one-hour boil may mean 3 or 4 hours of work between your prep, mash, boil, cleanup, and yeast pitch.

Once your prep is complete, you're ready to mix up the must – or "brew" your brew. Remember now, everything that touches your must should be sanitized!

Important Safety Note

Please use caution when moving larger glass carboys - especially when they're full. Keeping big carboys (3 gallons and larger) in milk crates makes them easier and safer to move. Additionally, never use carboy handles to move full carboys. If using a handle with an empty carboy, always support the glass from the bottom.

Mixing up the Must: You're Brewing!

Your must is the liquid to be fermented. For wines and meads the must typically gets mixed up in the bucket or carboy. In a wine, this means grape or other fruit juice, and sometimes added sugars. For meads this is the water, honey, and any other adjuncts to be added – like herbs or spices. In beer and braggot-making, this must is called "wort," and it comes together in the brew kettle during the mash, sparge, boil, and sometimes in the carboy, if you are adding adjuncts you didn't want touched by heat (like fruits or honey).

Recipes are important! There are tons online, or you can make your own. But it's important to have one and to write it down. That way, if you like it, you know what you did next time! Keep a brewing logbook and use it religiously.

Thorough recipe research is paramount to your brewventure's success. For example, maybe you're wondering how much nutmeg to use? Run your question through a search engine. Someone else has experimented with it and will have a recommendation. Deliberate on your recipe, make sure you have all the ingredients before you start mixing up your must, and make sure your ingredients are fresh and high quality! You get out what you put in.

And one final thing to remember when mixing up your must: fruit wine aficionado Jack Keller was once asked about whether to add a certain spice in primary or secondary. His answer was that the process of fermentation fundamentally alters anything it touches, and something going in at the beginning will not taste the same as something that goes in at the end. Fermentation is a wonderful and seemingly magical process, but remember that only experimentation will tell you if *you* like the taste of something like cinnamon once it has undergone the fermentation process. You may instead prefer your cinnamon (or whatever other ingredient) added in secondary or even after stabilization.

Primary

In primary, it's important to leave plenty of headspace on top of your must. It will begin releasing a lot of gas, which can push particulate up toward the airlock. CO2 displaces all of the oxygen over the must as it ferments, protecting it from oxidization issues. In fact, it is a good practice in primary to whip some oxygen into the must so the yeast has plenty to work with. If you have a lot of floating matter, like grape skins or dry hops, you will want to punch the cap every so often to ensure nothing on top of the fermentation gets dried out.

Once your must is ready and at your desired temperature (typically room temperature) it's time to pitch the yeast. If using a starter, you can simply pour it in and give it a swirl. If using a dry yeast, that may mean sprinkling the packet into the carboy, letting it rehydrate for a bit, and then giving it a swirl a little while later.

When your yeast is inside your fermentation vessel, you'll affix your airlock, and if it is a bubbler, fill it with water, vodka, or sanitizer. Now you're in primary fermentation.

This is the part where the yeast kick into gear and convert the sugars into alcohols (primarily ethanol) and carbon dioxide. Fermentation will also create reactions that change flavors throughout all the ingredients in the must. Patience is critical during primary fermentation. You can watch it bubble and foam and do its work for a few weeks – but resist the urge to mess with it. Unless you're adding yeast nutrient, punching down a cap, or maybe doing a degassing on a mead, the fermentation should be chugging along on its own. Every time you remove the airlock, there will be an opportunity for bad microorganisms to creep in. Primary fermentation, colloquially, refers to the period when a fermentation ferments through to completion.

Then, you move on to "secondary," which typically, involves no fermentation at all. Secondary refers to the time the mead needs to sit and clarify before bottling. However, some recipes will have ingredients used during secondary.

Secondary

Secondary begins when the must is racked from the fermentation vessel into another sanitized vessel. Racking utilizes a racking system, vacuum pressure, and gravity to siphon the fermented must with minimal air contact. Most popular among homebrewers these days are auto-siphons. After racking, many homebrewers will take the opportunity to degas the brew with a sanitized spoon or whip to get as much trapped CO_2 out of it as possible. This is typically unnecessary, as the act of racking the mead will do a gentle degassing at the same time.

Then, the yeast should be allowed to finish their work, if any remains. But by this point the yeast have typically cleaned up after themselves and dropped mostly out of suspension. Most of the dead yeast, byproducts, and debris leftover should've remained at the bottom of the primary vessel. That sediment can be discarded after racking.

Once the brew is in secondary, headspace concerns become more immediate. You will want to limit exposure of the mead to oxygen which can work to decrease the mead's shelf life – or worse, spoil a batch before it's even bottled. Using a carboy for bulk aging and clarifying will help moderate the potential of oxidization. With their narrow necks, jugs and carboys restrict the exposure of your mead to the air. Less oxygen in contact with your mead means less chance of oxidization in your secondary vessel before bottling. If you end up with a lot of headspace after racking, you can minimize it by topping up the carboy with a bottle of similar (or neutral) mead to get the liquid level up toward the neck

And then, the waiting. Sometimes, lots of waiting. Typically, the more complex the recipe and the higher the ABV, the longer you can expect to wait for "drinkability" to emerge. Clarification happens during this phase.

Back sweetening

Back sweetening is the process of adding sweetness back to a mead. This is always done after primary fermentation has completed. Back sweetening can be done with fermentable sugars like fructose, glucose, or sucrose – or with nonfermentable sweeteners like erythritol, xylitol, allulose, monk fruit extract, sucralose, or others. Different forms of these sugars – honey, brown sugar, agave, etc – will contribute some flavors and aromatics that could complement or *combat* the flavors already in your mead. Typically, a mead will be back sweetened with honey when possible, to amplify the honey flavors present in the brew.

There may be times when back sweetening is not necessary. If the fermentation has stalled and become microbially stable, there may be plenty of residual sweetness in the mead to not warrant additional sweetening. Or, perhaps the mead is perfectly delicious and balanced while dry. In that case, back sweetening would act to disrupt the mead rather than enhance it.

When using fermentable sweeteners like honey, it is important to ensure your yeast can no longer ferment them into alcohol. If the yeast consumes those sugars, your mead will no longer be sweet! The brew should be stabilized through chemical stabilization, pasteurization, sterile filtering, or reaching the Delle limit (concentration of sugars and/or alcohol that prevent microbial activity).

Stabilizing - Chemically

To add sweetening sugars to your finished mead, you'll need it to be microbially stable. This means the environment within the carboy must be such that microorganisms cannot effectively reproduce or synthesize. If the yeasts do reengage, your sweetening sugars will be fermented out and you'll be back to square one! Often, microbial stability is accomplished by adding some simple and safe chemical compounds, in very small quantities, that will help prevent refermentation.

If you're creating a product that will be still in the bottle, meaning *not* carbonated, you should consider stabilizing the mead so that fermentation cannot kick off again. This is important if you will be adding fermentable sugars like honey or sucrose to back sweeten. You want to avoid the potential that any remaining yeast will reactivate and restart the fermentation process, as this can create the dreaded bottle bombs!

Two chemical compounds are typically used to stabilize a homebrew beverage. The two chemicals used in tandem are:

Potassium sorbate. It is added to the end of the fermentation to ensure that the fermentation is halted. It is a preservative that stops yeast from reproducing, which contributes to the prevention of any renewed fermentations.

Potassium metabisulphite. An antioxidant that helps remove free oxygen suspended in the mead. Eliminating suspended oxygen helps to prevent spoilage and deprive microorganisms of a crucial element needed for their synthesis process. No synthesis means no restart to fermentation.

Using **potassium sorbate** to stop yeast from reproducing along with **potassium metabisulphite** to stop yeast's synthesis effectively stabilizes a mead from further fermentation.

One caveat to using chemical stabilizers: some meadmakers argue it adds a "shelf life" to the mead once packaged. There is some evidence that the sorbic acid (sorbate) we add for microbial stability remains in that form for about two years. Given enough time, it is purported that pineapple or celery flavors can manifest in the bottle as the sorbic acid breaks down into ethyl sorbate. However, I have personally never experienced this phenomenon.

Stabilizing - Pasteurization

Alternatively, a mead can be pasteurized if:

A. It is in the proper type of container (resistant to cracking from heating or cooling), and
B. If it is brought to the right temperature for a long enough period of time.

Bringing the mead up to temperature in an enclosed vessel must be done very slowly to ensure minimal stress to the glass. The vessel must also be sealed, so none of the alcohol or aromatics are blown off in the process. Exposing a mead to open air after pasteurizing increases the risks of wild yeast getting into the mead. Additionally, liquid expands when heated, so the vessel must not be over-filled. **For these reasons, it is important to pasteurize only finished and bottled mead.**

As you can see, several considerations must be made when choosing to pasteurize. This process also requires an instant-read thermometer so that temps can be measured precisely in the moment.

The basic process involves placing cloth towels in the bottom of a stock pot to keep your glass from directly touching the metal. Then, place the sealed, bottled brews in the pot. You will also place an unsealed bottle in the middle of the pot. Pour cold water into the open bottle and around your sealed bottles leaving the tops of your bottles above the water line. Then, very slowly, bring up the water temperature in the pot, checking the water in the pot regularly. Reaching 140F should take about one hour. You will then begin checking the temperature of the water in the unsealed bottle. Once it reaches your desired temperature, you're ready to begin your count:

- 140F for 22 minutes
- 145F for 7.5 minutes
- 160F for one minute

Best practice would be to then cut the heat and allow the bottles to come down to room temperature in the water bath. For convenience, I recommend to pasteurize in the evening, then allow to cool overnight.

Alternatively, this process can be conducted using an immersion circulator and water bath following a similar process. The less-direct heat is safer than a direct heat source like a stovetop burner. However, it can take a bit longer to reach the proper temperature.

Personally, I try not to recommend pasteurizing to beginners. It's too volatile. Small errors can lead to big losses - including losing a whole batch of mead or even physical harm. Bottle bombs are no joke!

Pasteurization should be done in the bottle as the final step. Attempting to either backsweeten *after* pasteurization, or performing a bulk pasteurization in the carboy *then* bottling both run the risk of introducing wild yeasts that could begin a refermentation.

Stabilizing – Sterile Filtering

For the new homebrewer, the thought of filtering may be a daunting one. To effectively filter a mead, there is a glut of gear and best practice to learn. For that reason, I won't go into great detail here. However, there are several homebrewing filtration systems available – and some local homebrew shops will even rent them out! To sterile filter in a way you can trust, you'd need to use a micron size of 0.45 micron or smaller. This size of filter pad will filter out even the tiniest bacteria, and of course, any remaining yeast. For sterile filtration to work as a stabilizer, **it must be a 0.45 micron absolute filter,** which are very expensive and can be difficult to acquire at the homebrew scale. And like pasteurization, sterile filtering needs to be done as the last step (to limit exposure to outside air).

*Note: The "sterile" filter pads available for the Buon Vino **cannot** be used for sterile filtration.*

Back-sweetening: Kegs vs. Bottle Conditioning

If you will be kegging and force-carbonating your mead, your only consideration around stabilization is whether or not the keg will be kept cold. If the keg will be stored in a kegerator or keezer, then back sweetening with honey is your ideal option.

A cold keg should give any remaining yeast a lot of difficulty fermenting out your back sweetening sugars. At temperatures of 40F or lower, most yeast will begin to hibernate. But if the keg will ever be stored above those cold temperatures, you should stabilize using chemical stabilizers.

If you plan to bottle condition your mead, you will need a nonfermentable sweetener to keep the mead sweet, and a fermentable sugar for the yeast to consume and turn into CO_2. That CO_2 will absorb into the mead and make it sparkling.

We recommend the sugar alcohol erythritol for back sweetening bottle conditioned mead. It is similar in flavor to table sugar (sucrose; cane or beet sugar), and, unlike another common sugar alcohol, xylitol, it is not said to have tummy trouble side effects. Erythritol is also not known to be hazardous to pets if accidentally consumed.

The bottle conditioning process involves adding a nonfermentable sweetener to taste, then adding a calculated amount of fermentable sugar for the yeast to turn into CO_2, and then bottling and allowing to age at room temperature for a few weeks. Bottles should be chilled before serving.

Contributions of Different Sweeteners
Various sugars and sweeteners can provide flavor and aroma contributions of their own. When choosing a sweetener, it is important to keep in mind how its flavor profile – neutral, forward, or pronounced – will complement or detract from your mead. Common sweeteners include:

Honey
Fructose and glucose. When possible, it is usually best to back sweeten a mead with honey. You could use the same honey that was fermented in primary, or, a different varietal or treatment (such as caramelized honey). Adding honey back to a finished mead can elevate the delicate honey flavors and aromatics in the mead, as well as provide added body and richness.

Maple syrup
Primarily sucrose, with some glucose and fructose. Some mead styles benefit from the unique characteristics that maple syrup brings to the table. It is buttery, woody, and slightly tannic. Maples from different parts of the world can also provide their own character and charm as well. Maple syrup does include a high water content, so it will dilute your final mead by just a bit.

Cane or beet sugar
Sucrose. Perhaps the most neutral sweetener for back sweetening, these granulated table sugars just taste sweet. Sweetness is essentially all they really contribute. However, table sugars are a pocketbook-conscious method of back sweetening meads without adding in other variables like excessive dilution or body.

Brown sugar
Also sucrose, brown sugar includes either residual or added molasses. These flavors are malty, caramely, and rich.

Molasses or Sorghum
These very dense sugars are malty, caramely, and rich. Usually, you would only want a touch of molasses or sorghum in your back sweetening bill.

Fruit juice concentrates
Available in your grocer's freezer section, canned fruit juice concentrates are preservative-free and come in a variety of flavors. From grape to apple to raspberry to piná colada – there is quite an assortment to choose from! These concentrates will also contribute acidity in addition to their sweetness, so you may want to use bench trials to determine how much you need to use.

Erythritol or xylitol
Nearly as clean as sucrose sweeteners, but about 70% as sweet, these "sugar alcohols" are nonfermentable and naturally-sourced from corn or wood sources. For bottle conditioning a sweet mead, these sweeteners can be clutch – because the yeast cannot consume them. So, you can dose your mead with a fermentable priming sugar, bottle, and have carbonated drinks about a month later. Some palates will perceive a slight "cooling" effect from sugar alcohols, but that effect is usually masked in drinks that contain alcohol (like mead). *Note: Xylitol is known to cause gas, bloating, and diarrhea in some people when consumed in large amounts. It can also be fatal to dogs if they eat it. For these reasons, we recommend erythritol where available.*

Allulose
A nonfermentable sweetener that has gained in popularity recently, I have found it to have a bit more flavor contribution than the more neutral erythritol. I would describe this flavor as "in the family of" artificial sweeteners like sucralose.

Monk fruit extract
Very, very sweet – this extract is usually used to help make erythritol sweet enough to be a 1:1 replacement for table sugars. A tiny amount of monk fruit extract on its own can sweeten an entire 5-gallon batch of mead! Though it does have a unique taste, which some might say is in the sucralose family of flavors. For this reason, it is typically blended with a larger quantity of another sweetener.

Fining – How to clear your mead

So much “stuff” can be suspended in the brew – proteins, pectin, yeast, and more. The *clearer* the mead usually means the *cleaner* the flavor profile. So, homebrewers employ a variety of tactics to get their meads cleared up.

Cold crashing is a popular choice. This method requires bringing the fermented mead down close to freezing temperatures for a few days to a week via a refrigerator, chest freezer, or even just cold ambient temperatures outdoors. Yeast and some proteins will precipitate out at colder temperatures – sort of like how ***we*** slow down the colder ***we*** get. Cold crashing can help clarity considerably.

Sometimes fining is a good choice. Fining involves adding polarized molecules to the mead, which will bond to other suspended molecules, make them heavy, and drop them out of suspension. Some popular choices are:

Bentonite. A clay created by volcanic ash. It is absorbent and binds to the particulates that make the fermented mead hazy. Once it binds to the particles, it will eventually fall out of the mead.

Sparkolloid. A hot-mix, proprietary fining agent which is effective against a wide range of hazes. Sparkolloid carries a positive charge, so it bonds with negatively charged particles, removing them from the mead. Sparkolloid is inexpensive and very effective, though the manufacturer has discontinued it.

Super-Kleer/Dual Fine. A two-stage homebrew clarifying kit. It contains two pre-mixed pouches. These pouches include kieselsol (a negatively charged fining agent made from silicon dioxide) and chitosan (a polysaccharide made from the chitin shells of shrimp and other crustaceans). The fining process works by creating both strong negative and positive charges in the brew, which allow for large yeast clumping and a typically speedy clarification.

Gelatin. A protein derived from animal collagen. You’re probably familiar with gelatin’s use in foods, but it is also a cheap way to clear meads. Gelatin finings help particulate to coagulate and drop out, and it is especially good at “sticking” sediment to the bottom of a carboy or bottle. Gelatin is often added when bottle-conditioning a mead that will be sparkling, because it can help the resulting sediment to remain in the bottle when pouring to a glass. Take note, though: gelatin can remove some tannins from your mead. So use when and where appropriate.

There are several other fining techniques and materials that can be utilized, like filtering. Or, just let it sit and clear on its own!

Bottling
Once fermentation is complete and your brew is ready to drink, you'll need to get it packaged up for consumption. While some homebrewers like to put their products into kegs, we will be discussing bottling only. Bottling is how the majority of beginner homebrewers package their meads, and if you're just starting out, most likely you will be bottling too.

Bottling works just like racking, except with an added piece of equipment – the bottling wand. The bottling wand is a valved contraption that gives you control over how the fermented mead gets from the carboy to the bottles. The bottling wand attaches to the end of the racking system via your tubing. When the valve is pressed against the bottom of the bottle, it opens up and your mead flows into the bottle from the bottom up. You lift when the bottle is full and move onto the next bottle. When you remove the wand from the bottle, there should be appropriate headspace remaining for corking. However, for a mead that will be capped and carbonated in the bottle, you'll want to leave a little bit more breathing room by lifting up when the liquid is an inch or so from the mouth of the bottle.

There are two common ways of sealing your bottles: corking and capping.

Corking
Corking is exactly what it sounds like. Putting a cork into a bottle. Per best practices, briefly sanitize and dry your corks prior to use.

For corked bottles, you will want to use bottles made for corking. This will most often be 750ml or one liter wine bottles, and those will most often be sized for #8 or #9 corks. You can use natural or synthetic corks, but most advanced winemakers will advocate for natural corks because they are said to provide better micro-oxygenation for wines. This process occurs due to ingress of tiny amounts of air from the cork into the bottle.

There are some excellent synthetic corks on the market now, too.

Using a bottle that isn't made for corking can have catastrophic effects. Don't do it. Also, do not cork carbonated beverages. The cork will be at risk of being pushed out the bottle – or, even worse, a bottle not rated for pressure can dangerously explode.

Corkers come in two types – floor corkers and hand corkers. Both perform the same function. A thin plunger pushes the sanitized cork into the bottle. A floor corker is typically more expensive, but provides better, more steady control. A hand corker is preferred by most due to its simplicity and how easy it is to store. However, it does require a steadier hand and, sometimes, a good set of knees.

Once bottles are corked, they should spend a few weeks upright. They can then be stored either upright or horizontally.

Capping
Capping is a whole other ballgame, and again there are a couple of options: hand-cappers and bench cappers.

Hand-cappers are similar to hand corkers. A magnet holds onto the cap while you place the bell on top of the bottle. With a little bit of pressure, the arms go down and the cap is crimped closed. The bench capper is typically bolted down to a work bench for stability. The bottle is placed under the height-adjustable bell and the arm is pressed down to cap the bottle.

Swing-tops
There is another alternative as well – swing tops. Swing tops use the force of pressure to hold a rubber or silicone gasket against the mouth of a bottle. For drinks that will be consumed soon, these can be a great reusable option.

Unfortunately, the gaskets on these bottles will dry and crack over time. They should not be trusted for long-term aging – and gaskets should be replaced annually if possible.

Square-bottomed swing-tops are not ideal for bottle conditioning brews and have a tendency to explode when pressurized. If bottle conditioning, seek out round-bottomed, pressure-rated swing-tops for safety's sake.

Still vs Sparkling

Bottling still brews – that is, non-carbonated – is fairly straightforward. The biggest concern is minimizing oxygen exposure.

Sparkling/carbonated brews are another beast entirely. Extra work must be done to ensure your sparkling brews do, in fact, sparkle. When not using a kegging system, two elements should remain in mind: priming sugars and PSI.

This section can't even begin to scratch the surface on the variety of priming sugars and methods of calculating how they will impact your final product. My recommendation is to search for "Priming Sugar Calculator" in your favorite search engine and input your own variables.

What you're looking for is the appropriate carbonation level for the style of braggot or mead you've fermented. Again, search engines are your friend when determining how to carbonate the product you've created.

The most common priming sugar is typically dextrose: corn sugar. Amounts are usually between 0.75 and one ounce of dextrose per gallon of mead.

And remember, your brew should not be stabilized if you want your yeasts to be able to ferment your priming sugars and carbonate your bottles.

The process is simple. Mix the appropriate amount of priming sugar with a cup of warm, sterile water and pour it into the bottling bucket. Then, rack on top of it, using the whirlpool of the racking tube to mix the priming sugar evenly throughout the batch. Then bottle away.

Give your bottled brews 4-6 weeks alone to condition. If you've bottled still mead, this time helps prevent bottle shock, a condition where freshly bottled wines taste flat and flabby. Bottle shock isn't well understood by current science – but what seems clear to most everyone, is that a little bit of time reverses the condition. So, once you've bottled, be willing to wait a month or two before consumption.

Corny kegs are also a popular option for carbonating homebrew. Much of the kegging gear on the market has been recycled from old soda stands from decades past. There are two common styles of corny keg: ball lock and pin lock. Deciding which style of keg you use will also determine what fittings you'll need to purchase to equip your kegs for CO_2 gas input and dispensing output.

Kegging is too broad and complex a topic to be covered in this book, which is geared toward beginner brewers. However, it is highly recommended for those who move a lot of homebrew through their household, as it lessens the workload, thought, and time required for sparkling drinks.

Bottle Storage
Capped bottles should be stored upright. For bottle conditioned meads, this also allows the remaining film of yeast to settle at the bottom.

Corked bottles using synthetic, natural, or agglomerate corks may be stored upright or on their sides after a few weeks standing upright. Recent studies have demonstrated little difference in how storage position impacts wine in the bottle, so it stands to reason that this information applies also to mead.

CHAPTER THREE

YEAST WRANGLING

You've just waded into the shallow end of the homebrewing pool. You've got your carboy, racking equipment, sanitizer, and airlocks. Now you need something to ferment.

Many first-time brewers start with something simple, like a wine kit, fruit wine, or mead. These ventures typically involve higher alcohol contents, avoiding some of the risks that come with sanitization and brewing beer. Sanitization is still necessary, but when the alcohol and CO_2 content rise quickly, your fermentables develop a natural "infection" resistance to molds and bacteria.

So you've gone and picked up three pounds of fresh, raw honey and a gallon of spring water. Now what?

Yeast! Your little yeastie-beasties are like pets that make booze for you. Yeasts convert sugars into alcohol and CO_2. If you've visited your local homebrew supply store, the number and variety of yeasts might have been daunting! Yeast in packets. Yeast in coolers. Liquid yeasts. Dry yeasts. Ale yeasts. Lager yeasts. Champagne yeasts! It's all so much!

Yeast Nutrition

Oddly, the subject of nutrition for our yeast in meadmaking has become a controversial concept over the last decade. Yeast nutrition, often regarded as an understood facet of winemaking both commercially and at home, has entered the realm of debate due the adoption of "Viking" practices in some circles of homebrewing. The belief goes as follows: Vikings made mead, Vikings didn't buy yeast nutrient from a local homebrew store to use in their process, and Vikings made palatable mead; so why should we do anything different?

This premise relies on some pretty speculative assumptions about how Vikings made mead, the potentially errant conclusion that their mead actually tasted good, and, overall, it borders on cosplaying Viking culture in a way that seems disrespectful to who they were as a people. The bottom line?

Yeasts are living organisms that require a balanced diet.

Just like pets, livestock, wild flora and fauna, and human beings. The mead made and consumed in the Viking age and dozens of cultures that preceded it was not the mead anyone is making now with glass carboys, sanitizers, auto-siphons, and lab-cultured yeasts. Mead made like a Viking would involve, at best, a large wooden vessel regularly topped up with honey, water, and whatever was being foraged at the time that might hide the flavor of the fermentation. It would have been inoculated by wild yeasts or the slurry from a colleague's house brew. It would be consumed young, it would be low to mid-range in ABV, and it would, in all likelihood, be somewhat foul/off.

Mead does not have to be that way. And today, even the more "natural" brewers among us would agree. If presented with both a glass of Viking-era mead and a modern meadery's finest traditional, I know which one they'd prefer.

Through science and innovation, we know a lot more about the nutrient requirements for yeast to successfully ferment honey water. Laboratories, wineries, and meaderies have been pioneering data-driven research into the topic. Homebrewers have adopted, and sometimes improved upon, those practices. Born out of this body of research are “Staggered Nutrient Addition” schedules, tailored to the specific nitrogen requirements of the yeast, the anticipated attenuation of the yeast (sugar consumption before fermentation halts), the potential ABV of the brew, and the type of nutrient being used. Yeast need assimilable nitrogen, usually in the form of amino acids, as well as vitamins and minerals.

You wouldn’t feed your children a diet of sugar and expect them to thrive. Why would you treat your yeast that way?

Yeast Assimilable Nitrogen (YAN)

This is the point most new meadmakers “nope out.” It’s the moment when jargon and science-rich talk enter the conversation. I will admit that, when I first began studying mead nutrition years ago, I was put off by the seemingly unending depth of what there is to know about the nutrient requirements of these single-celled little friends of ours.

Fortunately, I learned two things quickly: it’s not nearly as intimidating as it sounds, and there are a ton of online resources that can take the brain-load off us homebrewers. Nutrient calculators are a godsend for the lazier brewers among us (myself included). You only need to know the basics, the options, and the theory of yeast nutrition to be set up for success.

Yeast assimilable nitrogen simply refers to forms of nitrogen that the yeast can utilize during fermentation. Just like our bodies may store and use fat, vitamins, and minerals – yeast do as well, with some forms of nitrogen.

Recall from grade school chemistry that nitrogen is an element that can be bound to other elements to form molecules. Only some of these molecules are structured in a way that yeast can access and use them: certain amino acids, ammonia, and ammonium. Some of these are naturally present in fruit musts, but even in winemaking, they’re not present in the quantities needed to successfully complete fermentation 100% without off-aromatics, off-flavors, or undesirable changes to the mouthfeel and finish of the wine. If this is true for wine musts, then it follows that honey musts would be even more deficient in YAN – ***and they are.***

Chemical analysis has shown time and again that honey includes trace amounts of YAN. These quantities are not nearly enough to support a healthy yeast colony. Will your mead must ferment with no YAN added? Potentially, even probably – but it will be susceptible to fermentation stalls, temperature spikes, hydrogen sulfide problems (often described as “rhino farts”) due to stress, and longer aging times for off-flavor compounds to break down and mellow.

YAN is calculated in the parts per million (PPM). The average saturation PPM needed for a smooth mead fermentation runs around 200 PPM YAN. However, that number can vary greatly dependent on yeast selection, ingredients in the must, concentration of sugars, and anticipated attenuation. Sounds heavy, right? Fortunately, to take some of the effort out of it, some incredible mead scientists have coded and published online calculators for exactly this purpose. You can simply input your variables and the calculator will spit out instructions based on the nutrient schedule that suits your needs. More information on nutrient addition schedules is coming up in another section!

YEAST NUTRIENT OPTIONS

Fortunately, in most areas of the world, proper forms of yeast nutrient are readily available. Some do not even require a trip to the homebrew shop!

Organic and inorganic nitrogen nutrients serve different roles in home meadmaking. Organic nitrogen nutrients, such as yeast extracts and amino acid blends, provide yeast with complex, naturally occurring nitrogen compounds. These can enhance yeast health and fermentation efficiency, contributing to better quality mead. Inorganic nitrogen nutrients, like diammonium phosphate (DAP), supply yeast with simple, readily available nitrogen sources. While they can support a robust fermentation, excessive use of inorganic nitrogen can result in off-flavors. Therefore, striking a balance between organic and inorganic nitrogen can be crucial, as it helps maintain a healthy fermentation process and influences the mead's final taste and aroma.

Here are the most common options used in meadmaking:

Diammonium Phosphate (DAP; inorganic nitrogen)

Synthesized from the chemical reaction between ammonia and phosphoric acid, DAP is the most commonly used agricultural fertilizer around the world. Its prominence is due to its water solubility and high levels of nitrogen.

The nitrogen within DAP is yeast assimilable and extraordinarily accessible. Due to this ready availability, it is, in some sense, like giving the yeast an addictive substance. The hungry little yeast cells will seek out the easiest-access nitrogen they can get. So, adding DAP to a mead must has the potential to draw the yeast's "attention" away from other compounds in the must. Additionally, the physiology of brewing yeasts changes at around 9% ABV within the fermenting must. At this point, the yeast will become less and less likely to engage in uptake of inorganic nitrogen. So not only will DAP added or still remaining in the must at this juncture be wasted, but it can also contribute off-flavors by remaining in suspension after fermentation has completed.

DAP is a great nutrient for many, specific, applications. However, DAP is best used in combination with another source of organic of nitrogen (perhaps another nutrient or a fruit) – otherwise you run the risk of faults or stalls.

Fermaid O

A product manufactured by Scott Laboratories, described as "a blend of highly specific inactivated yeast fractions that are rich in assimilable amino acids" with a low amount of measurable organic YAN.[1] This does not necessarily mean that it is not an effective nutrient – in fact, it is my primary yeast nutrient. However, using only Fermaid O in high-ABV meads carries some risk of faults and stalls.

Fermaid K

This nutrient is regarded as a relatively balanced in-between of Fermaid O and DAP – because, essentially, it contains both. It is described by Scott Laboratories as "a blend of assimilable amino acids from inactivated and autolyzed yeast, sterols and unsaturated fatty acids, magnesium sulfate, thiamin, folic acid, niacin, calcium pantothenate, diammonium phosphate (DAP), and inactivated yeast."
nutrition research, Fermaid K is a remarkable engineering accomplishment. But, like Fermaid O and DAP, it has its specific place in the meadmaking world.

1. https://scottlabsltd.com/en-us/fermaid-o-fermo 2. https://scottlabsltd.com/en-us/fermaid-k-fermk

Yeast Hulls
Commonly cited online as a nutrient for yeast, yeast hulls are a dead yeast additive meant for unsticking a stuck fermentation. Acting as a sort of sponge for soaking up compounds that may be inhibiting your active yeast, they're meant to improve the environment in your primary vessel. As they are included as one of many components in Fermaid K, the misconception that yeast hulls are intended to be used as yeast nutrient has propagated around the web. While yeast hulls do, technically, include some vitamins and nutrients as a product of literally being dead organic matter, they do not actually contain the *substantive* amount of free amino nitrogen (FAN) yeast need as part of a balanced diet. Yeast hulls should be considered a nutrient option of last resort, and are most effective when paired with a nitrogen source like DAP. Follow the same dosage recommendation as if using the boiled bread yeast method below.

Boiled Bread Yeast (BBY)
Similar in practice to using yeast hulls as a nutrient. And if paired with DAP, it will provide a more balanced nutrient than *only* using DAP. Additionally, it is perhaps the most accessible item on this list the world-around. Dose BBY as you would Fermaid O, but triple the amount by weight. So, if your nutrient calculator recommends 10 grams of Fermaid O, you would instead use 30 grams of BBY. Simply weigh out the needed amount of bread yeast, mix it with enough water to form a loose slurry, and boil to inactivate. The BBY slurry can then be added to the mead.

Go-Ferm
This yeast rehydration nutrient prepares dried yeast for fermentation by providing essential micronutrients and minerals to enhance yeast health and reduce stress during rehydration. This generally results in a more complete and cleaner fermentation – and minimizes the risk of off-flavors or fermentation issues like slow starts.

Yeast rehydration nutrients are an integral part of the calculation when using online mead nutrient calculators.

High YAN Fruit Sources
There are a few fruit sources, like mangoes, that are naturally high in YAN. However, as of the writing of this book, there is not a lot of available, reliable information on YAN content by individual fruits. For this reason, I would recommend ignoring the YAN contribution of fruit unless you have a very good idea of its YAN content.

Raisins
This is a myth popularized by the inundation of homebrewing books that flooded the American market when President Jimmy Carter legalized homebrewing. Depression-era and earlier homebrewing recipes often included raisins as extra food for the yeast. So, it tracks that recipe book writers, rushing to get their books to market, would parrot these inaccurate recipes and processes. We now know that raisins do not have significant amounts of YAN and therefore are not a proper yeast nutrient. Again, if YAN is regularly added to commercial wine musts fermented on the skins, why would dried-up grapes ever be good nutrient?

A Warning about Urea in Nutrient Blends
Homebrewing yeast nutrients that contain urea are considered dangerous due to urea's potential health risks and undesirable effects on the final product.

Urea, a compound containing high levels of nitrogen, can lead to the creation of the compound ethyl carbamate when in contact with ethanol. Ethyl carbamate (and leftover urea itself) can impart unpleasant flavors and aromas to the mead, rendering it unpalatable. **These compounds can also be carcinogenic, leading to serious health problems.**

In commercial wine production, urea is strictly banned to maintain the highest quality and safety standards. The wine industry adheres to stringent regulations and quality control measures, and the presence of urea can compromise the purity and sensory characteristics of the wine. But on the homebrewing scale, no such regulations exist, so many manufacturers of cheap yeast nutrients include urea in their blends. Avoid urea-based yeast nutrients at all costs.

NUTRIENT SCHEDULES

Two methods for introducing nutrients into your must are recommended in the recipes sections of this book: staggered nutrient addition (SNA) protocols and simple "frontloading." Recommendations are based on the yeasts and anticipated fermentation speed of the mead.

Staggered Nutrient Addition Regiments

Many years' and barrels' worth of research has gone into determining the best way of nutrifying mead must. Through this experimentation, we had the development of a process of adding multiple timed, measured additions of nutrient. These staggered nutrient additions are designed to "time release" nutrient into the must.

Yeast are not sentient. Therefore, yeast do not have impulse control. When these voracious little microbes encounter an environment rich in nitrogen, they binge. The increased activity generates heat, and this heat can cause the yeast to throw off-flavors and generate fusel alcohols that can take a long time to break down and smooth out. Staggering our nutrient additions, so that the yeast have the nutrient they need, when they need it, reduces the risk of these temperature spikes within your fermentation vessel. For higher gravity musts, like those with a potential ABV of 9% or higher, this provides for a more consistent, regulated primary fermentation.

Put simply: adding nutrients to our must prevents yeast stress that causes one set of off-flavors and aromas, while staggering those nutrients helps to prevent yeast stress that causes another set of off-flavors and aromas.

Staggered Nutrient Additions (SNA)

The classic mead nutrient protocol. Meadmakers will simply calculate the amount of nutrient required for the must and divide it up as they see fit. Most commonly, this will mean four staggered additions of equal portions. However, some will instead opt for larger additions at the beginning of primary fermentation and step down to the final addition. This regiment is simple, allows for a bit of whim, and is effective without overcomplicating the process.

The TOSNA 2.0 & TOSNA 3.0 Methods

Tailored Organic Staggered Nutrient Additions are perhaps the most used nutrient schedule. The 2.0 method (later upgraded to 3.0) calculates the nutrient requirements for the homebrewer based on batch size, gravity implications, and yeast selection. TOSNA 2.0 utilizes Fermaid O (or sometimes yeast hulls) to provide a boost to organic nitrogen within the must via four nutrient additions. The use of Go-Ferm is highly recommended when following a TOSNA protocol.

The Travis Blount-Elliott Method

This method, which is quickly becoming favored by many modern-practice meadmakers, involves using Fermaid O for the first two nutrient additions and finishing with a combination of Fermaid K and DAP for the latter two nutrient additions.

This method affords a more metered and holistic approach that factors in potential negative flavor contributions and legal limits (in commercial wines/meads) for certain nutrient types. It also

trends toward a more stable minimization of temperature spikes. Online calculators are available to customize this nutrient regiment to your yeast and must.

Frontloading

Some meads, particularly lower alcohol hydromels and session meads, may ferment so quickly that a staggered nutrient addition protocol could not be completed in time. For these brews, it is often valuable to instead frontload a slightly lower nutrient load all at once. Often the best choice for this is DAP, pitched in at the 24-hour mark. Fermaid O works well for this purpose also.

Frontloading of nutrients is not necessarily as researched a procedure in mead in the way SNA is. However, calculating your nutrient requirement for a sub-8% ABV mead using a nutrient calculator, adding all of those addition amounts together, and reducing it to as much as 80% of the original volume, can create a decent baseline for frontloading a hydromel. For example, if your TOSNA 2.0 calculator instructs you to add a total of 10 grams of Fermaid O to a hydromel, you could feel comfortable in frontloading 8 grams at 24 hours into fermentation.

Step-feeding Honey for High-ABV Recipes

This is the practice of adding incremental honey additions to *eventually* get a must up to the desired concentration. The theory behind this practice is that it keeps the sugar concentration lower, contributing to a less stressful environment for the yeast. Step-feeding can be helpful for brews targeting especially high ABV (OG > 1.130) as it can alleviate stress from high osmotic pressure. Outside of high-ABV meads, step-feeding is a nonstandard practice that makes calculating ABV more difficult.

Yeast Tolerances

If you search out the specification sheet for any brewing yeast – or take a look at most packages – you'll see an alcohol tolerance listed. This number is the point where the yeast typically slows down and ceases its activity. So, if the potential ABV of your brew is 14%, but your yeast maxes out at 12%, you have the potential to end up with a naturally sweet mead. This tolerance number is an estimate, however. One can expect their yeast to finish at +/-0.5%. So, if the prescribed tolerance is 12%, the yeast may give up at 11.5% or 12.5%. Complicating things more, with proper nutrition and temperature control, you may be able to push a yeast a few percentage points over the tolerance. For example, the yeast strain QA23 has a listed alcohol tolerance of 16%, but meadmakers regularly push it to 18% using modern practices. Yeast tolerances are a guideline, but not a rule.

Further, when using beer yeasts (ale or lager) to make mead, the manufacturer's listed yeast ABV tolerance should be completely ignored. Beer yeast tolerances are calculated using projections based on complex malt sugars, which honey doesn't have.

YEAST TYPES

Brewing yeasts have been selected over many centuries – and with a great bit of emphasis over the past 100 years. This selection process has focused on various attributes that make certain strains desirable. For example, beer yeasts have a knack for fermenting maltose – a malt sugar that wine yeasts often can't (or won't) eat. Some have been selected for improved color and tannin extraction. Others produce esters during fermentation that can complement certain styles. There are even yeasts that will metabolize certain acids or create acids! Yeast selection is one of the most important decisions you can make when crafting your mead.

Wine Yeasts …and Champagne Yeasts

Red wines, white wines, and sparkling wines – how could they be so different? Well, depending on the yeast you choose, even the same grape juice fermented with two different yeasts could come out tasting like completely different wines!

Strains selected for red wines often help bring out berry flavors, pull color and tannin compounds from the skins, or even enhance notes of spice inherent to the fruit. White wine yeasts are often selected for clean fermentations, production of juicy or floral esters, and even for enhancing flavors like tropical notes. Champagne yeasts have been selected to go where others rarely dare – into the higher ABV range. In the industry, champagne yeast is added to fermented wine for a secondary fermentation that occurs within the bottle. This second yeasting requires yeast that can kickstart even in an alcohol-saturated environment. For this reason, the alcohol tolerance of champagne yeasts is higher than many other yeasts.

Wine yeasts primarily consume sucrose, glucose, and fructose. And, unlike beer yeasts, they typically don't chew through maltose and other complex sugars.

Beer Yeasts

Beer yeast comes in two different forms - saccharomyces cerevisiae and saccharomyces pastorianus. Genetically, the S. cerevisiae that ferment beers are the same as those that ferment wines and meads. Distinctly, these S. cerevisiae are "top fermenting" yeasts used in ales. They can ferment at a range of temperatures, but are more aggressive in warmer fermentation conditions. S. pastorianus, on the other hand, are "bottom fermenting" yeasts more acclimated for fermenting at cooler temperatures – *lager* yeast. If using a beer yeast for mead, more often than not, you'll be using an ale yeast rather than a lager yeast. Ale yeasts can be great for many mead styles, including cysers, hydromels, and braggots.

Gaining in popularity (or, re-gaining in popularity?) are kveik farmhouse ale yeasts. Many kveik strains have hundreds of years of history. These are aggressive strains from Norway that are incredibly versatile. They can ferment at cool or warm temperatures – and for many strains, they can produce fun and funky esters when fermented hot. Kveik does come with a caveat, though – these yeasts gobble up nutrient like there's no tomorrow. So you may need to add 50-100% more nutrient to your batch for a smooth fermentation.

Cider Yeasts

A few cider-specific yeasts have hit the market over the years. There is little to say about them other than that they seem to come and go – and most are bred from wine yeasts. The intention is for these yeasts to be trustworthy to enhance apple and fruit notes in a cider. Though many less expensive white wine yeasts and ale yeasts can do this just fine.

Mead Yeasts

On the heels of the burgeoning cider yeast industry comes: the mead yeast industry! These are also typically wine yeasts selected for enhancing floral flavors and creating lovely esters, but repackaged under a new name. My recommendation? Skip past the "mead yeast" and choose the right yeast for your brew without it being wrapped up in marketing hype.

The Bottom Line

The best way of choosing the right yeast is to download a manufacturer's handbook of all their available yeasts and select based on what contributions you'd like to make to your must. Or, find an online community and simply ask around. Homebrewers love sharing what they know with one another.

EC-1118 Champagne Yeast:
Best Yeast for Beginner Brewers?

If you're just starting out homebrewing – heed the following advice. Until you get the hang of making mead at home, there's one yeast that is almost *designed* to benefit you: the controversial EC-1118. This hardcore champagne strain is a beast in the carboy and won't let you down – unless, potentially, if used in a braggot. As mentioned, wine and champagne yeasts aren't always the best at fermenting the maltose in a braggot.

Some may say, "but wait, isn't that yeast the main ingredient in homemade rocket fuel?" Well yes, sometimes. But used correctly, with good record keeping and sanitization, EC-1118 is your best friend in your first fermenting foray. Here's why:

It's Affordable and Accessible
Expense is perhaps the foremost concern for the novice homebrewer – and cost-effectiveness is on your side with EC-1118. Because of the sheer demand for this yeast strain, supply is always ample. You can obtain ten-packs online for just a few dollars. And it will keep in the fridge for years. I have yet to set foot in a homebrew shop that didn't have a rack of EC-1118 in the winemaking section. For a dollar per five-gallon batch, this yeast is easy on the wallet – and easy on your mind.

Low Foam
Once EC-1118 takes hold of your brew, it keeps itself under control. Some yeasts, like Lalvin's D-47, create a lot of foamy CO_2. This foam will travel up the neck of your carboy and out through the airlock. While EC-1118 isn't perfect in this regard, it is specially bred to have low-foaming characteristics. So you should have less risk of a mess.

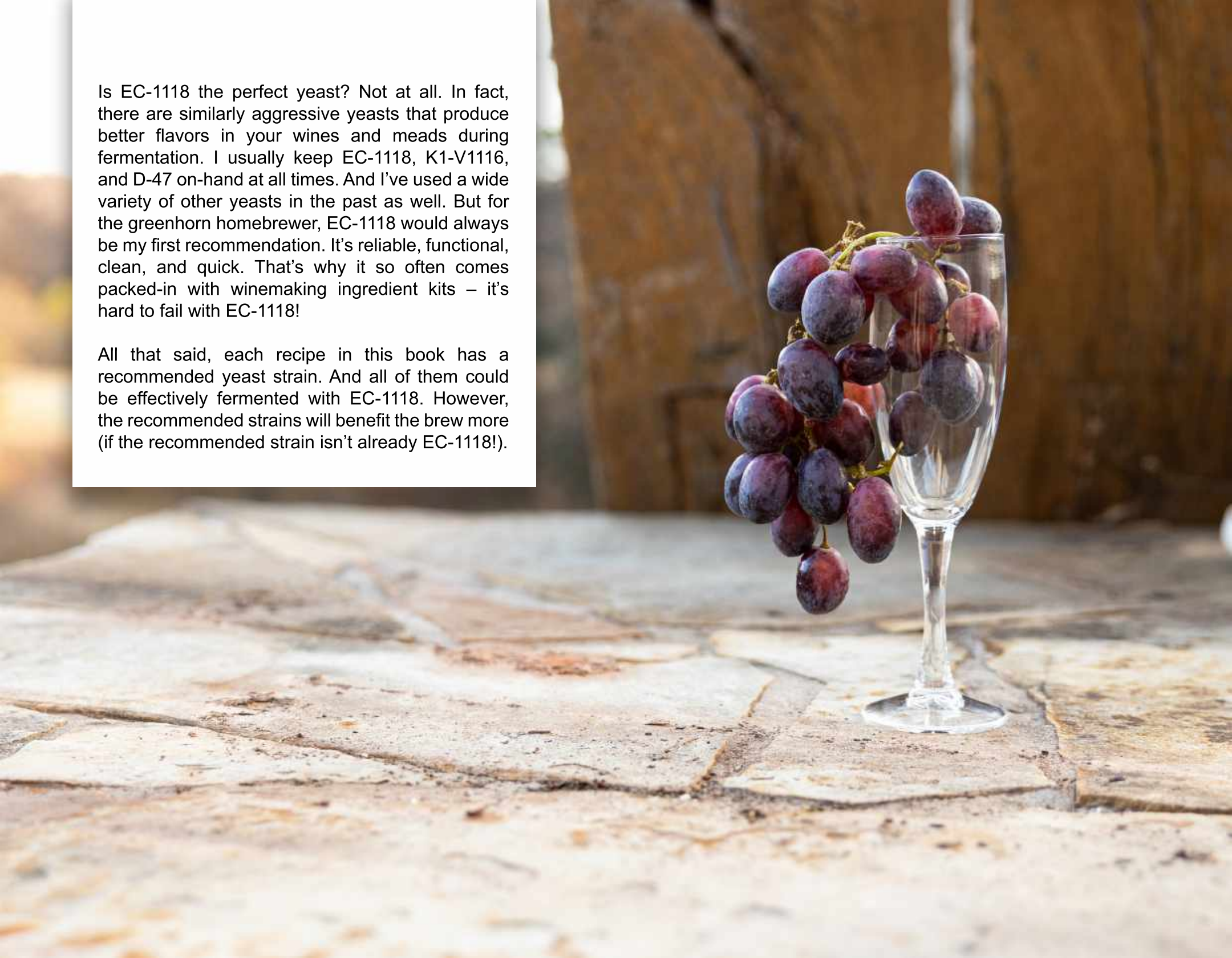
Competitive Eater
Not to be outdone, EC-1118 is also a competitive yeast. It eats and reproduces faster than most yeasts out there – especially the ones that occur naturally in your home. Luckily, this means EC-1118 will out-compete other yeasts and prevent them from thriving. You'll get consistent results nearly every time you brew with it. A bonus: if your fermentation with another yeast strain gets stuck and you need to call in reinforcements, EC-1118 will typically jump right to work. It will happily clean up the residual sugars and by-products made by your previous yeast. It's like your little superhero leaping in to save the day.

It Will Go All the Way with You
Speaking of its ability to clean up – EC-1118 will ferment pretty much any recipe dry. For a new homebrewer, this can be crucial. Some yeasts have tolerances of 12-16% alcohol. These tolerances can prevent them from consuming all the sugars in the must. If you want an insurance policy that your brew has fermented all the way out, EC-1118 is the optimal choice to get you there. Several risks come with incomplete fermentations, such as re-fermentation after bottling or cloying sweetness in a final product. With EC-1118, a trusted recipe, and hydrometer, you shouldn't have any concerns that your meads and wines will be completely dry! Then you can stabilize and back sweeten if you wish.

Flocculation Domination
Once fermentation is completed, and the yeasts have cleaned up after themselves, you'll have to rack (siphon) your brew off the yeast sediment. EC-1118 makes this a piece of cake. This yeast strain is "high flocculating," meaning that once it has lived out its purpose, it clumps together and falls to the bottom of the carboy in a firm, compact "cake." This high flocculation means there will be less disturbance to the yeast when moving your carboys around or when racking to your bottling bucket.

Is EC-1118 the perfect yeast? Not at all. In fact, there are similarly aggressive yeasts that produce better flavors in your wines and meads during fermentation. I usually keep EC-1118, K1-V1116, and D-47 on-hand at all times. And I've used a wide variety of other yeasts in the past as well. But for the greenhorn homebrewer, EC-1118 would always be my first recommendation. It's reliable, functional, clean, and quick. That's why it so often comes packed-in with winemaking ingredient kits – it's hard to fail with EC-1118!

All that said, each recipe in this book has a recommended yeast strain. And all of them could be effectively fermented with EC-1118. However, the recommended strains will benefit the brew more (if the recommended strain isn't already EC-1118!).



CHAPTER FOUR

THE WILD WORLD OF HONEYS AND MEADS

In mead, the odds of excellence generally increase along the same curve as the quality of ingredients used. Your input directly affects your output. Perhaps most important of your choices when crafting a mead recipe is that of the honey selection. Often, a good clover or wildflower honey will work for most applications. But honey can be used to enhance other ingredients – or it can be the main star itself. Understanding how the aromatics and flavors of honey play out over the course of fermentation will help to give you an overall better understanding of how to work with this most prized ingredient.

Honeys

Our friends, the bees, make honey to sustain the hive. The honey is made from the nectar of flowering plants after being transformed by enzymes and reduced to the proper concentration through evaporation.

The less expensive and more common honeys are typically mixed varietals from wildflowers or from vast fields of clover. They are often neutral, light, and delicious. These honeys can make wonderful mead.

Dark honeys like buckwheat or forest honey can provide maltiness, depth, minerality, earthiness and intrigue. Often, it is recommended to use a darker honey as just part of the honey bill in a brew. But I recommend that you do what suits you! I have made some traditional meads from buckwheat honey that have been real crowd-pleasers.

Fruity honeys like orange blossom, blueberry blossom, and apple blossom are wonderful for traditional meads, session meads, and fruited meads like cysers or melomels. This is especially true when using these honeys to back sweeten a batch. The fruitiness of the honey can amplify the flavors already present in the mead itself.

Some honeys, like sourwood, alfalfa, and eucalyptus bring their own flavor contributions to a mead. While each is still delicate and nuanced, monovarietal honeys from flavorful sources can provide a brilliant layer of personality to a mead.

Your honey choice is often the most important choice you will make when assembling your own recipes. Taste a ton of honeys – buy a new varietal when you see one – and learn what they can lend to your flavor profile in the brew. There's a vast world of honey out there, and nearly all of them can become wonderful mead.

The honey evaluations on the following page are not comprehensive, so there will be many, many varietals not represented in the chart. Additionally, honey aromatics and flavor depend on lots of factors, so honey can vary from source to source within the same varietal. However, these evaluations should be helpful as a starting point guide.

honey varietals

VARIETAL	AROMA	FLAVOR	COLOR
Acacia	sweet indistinct	floral light	pale yellow
Alfalfa	grassy	straw like, sweet hay	pale amber
Basswood	earthy	strong, spices	amber
Apple Blossom	floral sweet	light tealike	pale amber
Beechwood	funk, strong cheeselike	bleu cheese, funky	pale amber
Blackberry	fruit	strong tea, fruit	amber
Blueberry	lemon peel, citrus	citrus front	pale amber
Brassica	indistinct vegetal	sweet potato	pale amber
Buckwheat	molasses, cake batter, barnyard, chocolate, barley	cacao, sour, rich chocolate molasses	dark brown
Carrot Flower	vegetal, pumpkin, berry	light toffee, earthy, licorice	pale amber
Cherry Blossom	floral, touch of cider	upfront sweet, floral, candy	pale amber
Chestnut	mousey, musky	rich malt	amber
Clover, Red	rich floral, meadow	sweet, fruit punch	pale amber
Clover, Sweet	rich floral, baking spices	cinnamon and warm spice	pale amber
Clover	clear apple juice, medicinal	cotton candy, rich cinnamon	pale yellow
Coreopsis	caramellized sugar,	toffeelike	dark amber
Coriander	spices strong floral	candied ginger	dark amber
Echinacea	black tea, citrus	taffy, soft spices	amber
Fireweed	summer fruit, canteloupe	spiced oranges	amber
Goldenrod	fresh cut wood, treacle, allspice	christmas spices	amber
Heather	leather, heavy floral	liqueur like, rich, floral	dark amber
Holly	floral, herbaceous	thyme, stone fruit	dark amber
Huckleberry	floral, plums	sweet indistinct	amber
Lavender	sour orange, white nectarine	perfume, floral	amber
Leatherwood	buttery toast with honey	rich foral, awesome	amber
Manuka	orange slice candy, medicinal	thick, herbal medicine	pale yellow
Maple	lemon tea	soft citrus	pale amber
Meadowfoam	toasted marshmallow	cocoa, spices	dark amber
Mesquite	light citrus	peach, mango syrup	amber
Orange Blossom	orange peel, OJ, citrus, peach, bitter	orange soda, candied orange peel, floral, light citrus	pale yellow to amber
Poison Oak	floral, pine, citrus	creamy, summer fruit	amber
Rambutan	berry, black cherry	mint, berry	dark amber
Raspberry	soft floral, light rose	indistinct berry	light amber
Sage, Black Button	sage is prominent	herbal, lime	yellow
Snowberry	pear notes, floral	red plums	amber
Star Thistle	wildflowers, yuzu	clean, spice, hint of maple	pale amber
Thistle Vetch	coffee notes	sweet vegetal	dark amber
Tulip Poplar	sour, chocolate notes	butterscotch and chocolate	dark amber
Ulmo Tree	fresh citrus	papaya, mangosteen	light amber

Huge thanks to Reddit user Kurai_ for their public domain contributions to this list, used with permission.

TYPES OF MEAD

Mead categorization is a funny thing. There are silly names – and some with deep historical context. There is vigorous debate amongst meadmakers as to what qualifies for some categorizations. And there is some overlap – for example, many will call a blueberry mead a “bilbemel” while it falls well within the realm of melomel. My advice is to not get too caught up in classification, though still have some idea of the category within which your mead may fall. Here’s a list of common mead types you may encounter in your brewventures:

Acerglyn: A mead made with maple syrup. The maple can be part of the bill of fermentable sugars or used in backsweetening. Fermented honey is necessary, though.

Bilbemel: Mead made with blueberries and honey.

Black Mead: Mead made with black currants and honey.

Bochet: Mead made with honey that has been caramelized or burnt. The caramelized honey can make up all or part of the honey bill, and contributes toffee, marshmallow, and even butterscotch flavors.

Braggot: Mead made with malted grain, often including liquid or dry malt extracts. Colloquially, a braggot is accepted as any mead where honey makes up 51% or more of the fermentable sugars when accompanied by malt. However, there is disagreement in the community on how much honey must be present in the brew.

Capsicumel: A mead with peppers in the mix; typically jalapeno, habanero, or super-hots like the infamous ghost pepper. In a capsicumel, the pepper should be a prominent flavor, though it may be accompanied by other fruits or spices.

Cyser: A mead made with apples, cider, or apple juice. It is not uncommon for a meadmaker to use apple juice in primary and fresh apples in secondary.

Hippocras: A pyment (grape juice mead) with added spices like cinnamon, ginger, cardamom, and clove.

Metheglin: A mead made with dominant herbs or spices. Warm spices like clove, cinnamon, and nutmeg/mace are common. However, this could also include brews with herbs or spices like mugwort, heather tips, and sumac.

Melomel: Mead made with fruit or fruit juice – often with berries, tropical fruits, or other non-pome family fruits.

Morat: Mead made with mulberries and honey.

Mulled Mead: A mead that is spiced just prior to drinking, often served hot. Spices used are typically in the “warm” family, including cinnamon, clove, nutmeg, and ginger. Peppercorns or teas might also be used.

Omphacomel: Mead made from the juice of unripe grapes: “verjuice.” It can be very tart. Often categorized as a sub-type of pyment.

Oxymel: Mead with vinegar added. Historically used more in a medicinal sense than recreational or ceremonial.

Pyment: Similar in nature to wine, this mead is made with grape juice or grapes – whether as a fermentable sugar in primary or as a flavor addition in secondary.

Rhodomel: A mead made using rose petals in primary or secondary.

Show Mead: A mead made with only honey, water, and yeast. One of the most difficult meads to brew well. A show mead’s flavor relies only on water chemistry, honey, and yeast contributions.

There are also many names for different mead styles and mead-adjacent beverages from around the world. While we could list all of them, many are in fact small regional styles. It would be inappropriate to label many by the country's name due to their isolation. However, a few styles stick out prominently and have been of interest to homebrewers over recent years:

Polish meads:

- Czwórniak: three parts water and one part honey
- Trójniak: two parts water and one part honey
- Dwójniak: equal amounts of water and honey
- Półtorak: one part water and two parts honey

Also of note are:

- Sima: a mead popular in Finland, made with honey, water, lemons, and often raisins
- Tej: Ethiopian and Eritrean mead, made with honey, water, and a shrub called gesho

Mead is also generally classified by alcohol strength into three common categorizations. Arranged from lightest to heaviest:

Hydromel - 3.5% to 7.5% alcohol

Session Mead. Light mead, similar to a pale ale or hard seltzer. These meads are often served sparkling. Some mead makers will brew session meads up to 10% ABV, though the 3.5% to 7.5% range represents the majority.

Short Mead or Quick Mead. Similar to many lower-ABV beer styles, a short mead is one that is designed to age quickly to be enjoyed much sooner than a headier drink. These may be served sparkling or still.

Standard Mead - 7.5% to 14% alcohol

This category encompasses the majority of meads made today, both commercially and at home. Many mead styles fall within this band.

Sack Mead or Great Mead - 14% to 18% alcohol

These meads are higher bodied, with much bigger honey bills than their lower-ABV counterparts. They are viscous, typically quite sweet, and often have a "chewiness" to their mouthfeel.

Other high-ABV meads:

Dessert Meads or Honey Wines. 14% to 22% alcohol. These meads may also be categorized as sack meads, but have a distinct thickness, sweetness, and indulgent quality about them. They are definitely sippers!

Fortified Meads or Honey Liqueurs. Up to 60% alcohol. These are meads that have been fortified with distilled spirits like grain alcohol, brandy, or rum. This category also includes spirits sweetened with honey – though, debatably, they are not technically mead.

CHAPTER FIVE

AVOIDING COMMON PITFALLS

Like any artisanal pursuit, meadmaking comes with its share of challenges that can get in the way of making that perfect, shareable batch. Even the most expert meadmakers run into some of these issues, so don't feel alone if you do too. It is important to know how these problems arise, how to avoid them, and the possible fixes. That's how we avoid wasting potentially expensive ingredients!

From fermentation woes to flavor imbalances, potentially dangerous situations, and financial risk assessments, we will delve into how to identify, prevent, and address some of the most common issues that meadmakers encounter. By arming yourself with knowledge and practical solutions, you'll be best prepared to create exceptional meads!

Oxygen Management

Managing oxygen exposure and headspace is crucial to ensuring the quality and longevity of your mead. Oxygen, while necessary for the initial stages of fermentation, can be detrimental to mead once primary fermentation completes. Too much oxygen exposure can lead to oxidization, causing the mead to lose its delicate fresh flavors, develop off-putting aromas, and even turn a nasty brown color. To avoid these issues, it's important to minimize oxygen exposure during and after primary fermentation.

It's important to leave plenty of headspace in your primary fermentation vessel to allow for oxygen absorption and for your must to expand and climb up the sides of the vessel. But after racking to secondary, you want to have as little air on top of the fermented mead as you can manage.

Recall that the "secondary" phase of fermentation is when the yeast have finished converting sugars into alcohol. At this point, it's essential to reduce the amount of oxygen the mead comes into contact with. Oxygen can infiltrate through dry airlocks, gaps in closures, and any empty headspace in the container – especially if you're opening it to mess with it.

One effective method to limit oxygen exposure is by using an airlock that prevents external air from entering while allowing carbon dioxide, a natural by-product of fermentation, to escape. Even after primary fermentation, plenty of CO_2 will be leaving the mead. So, it's important to keep an airlock on the carboy to allow that pressure to escape while keeping the ambient air out. As a bonus, this helps keep airborne microorganisms from finding their way into your mead.

Another approach is to minimize headspace – the gap between the top of the mead and the container's lid or closure. This can be achieved by transferring the mead to a smaller container or using inert gases like nitrogen or argon to displace the oxygen in the headspace. Some people will recommend physical fillers like marbles, beads, or even ball bearings. Do not do this! These fillers are difficult to sanitize, can be made with hazardous materials, and even cause damage to your brewing vessels. The best way to minimize headspace is to

make a slightly larger volume of mead in primary than the volume of the vessel you plan to rack to for secondary. Once you leave the “lees” behind, you should be able to fill up that smaller vessel with ease.

For example, you might brew 1.25 gallons of mead in a 2-gallon bucket, then rack the resulting 1 gallon of mead into a 1-gallon carboy.

To know if your mead has become oxidized, there are several sensory and visual cues that will tip you off. A mead that has undergone excessive oxidation might display aromas reminiscent of vinegar, wet cardboard, or sherry wine. These are often described as "off" or "stale" aromas. The mead's color can also change, with red meads turning more brownish and white meads becoming darker and losing their vibrancy. Additionally, the mead's flavor profile can become dull – with delicate fruity or floral flavors becoming muted over time.

Pay attention to any changes in aroma, color, and taste throughout the aging process. And don’t open the carboy unless you have to! The easiest way to oxidize your mead is to mess with it out of impatience. If you do suspect oxidization, it's recommended to bottle the mead sooner rather than later to prevent further exposure to oxygen. Proper sealing of mead bottles and storing them in a cool, dark, and stable environment will also help preserve the mead's quality over time. If you’re not opposed to using sulfites in your brewing, adding a small dose (as little as half a Campden tablet in a five-gallon batch) can help scavenge oxygen and remove it from solution during aging. Many modern meadmakers will add a small dose of potassium metabisulphite every time they rack their mead.

If you’re a beginner meadmaker, and you are able to clear your mead early on through fining or cold-crashing, feel free to move right to bottling. Oxidization risk is much higher in bulk aging than bottle aging. So, you can skip that risk entirely! Just make sure your mead is stable prior to bottling.

Detecting oxidization early through proper sensory evaluation and visual cues allows you to take corrective actions and prevent the mead from deteriorating. But prevention should always be your goal!

Hydrogen Sulfide (H_2S)

Hydrogen sulfide is a compound that can impart off-putting aromas of rotten eggs or sulfur to mead, negatively impacting its quality. As mentioned previously, this is often joking called “rhino farts.” Understanding the sources of hydrogen sulfide, employing preventive measures, and knowing how to address it will give you some peace of mind. This is a pretty common occurrence – don’t fret if you walk into your brewing space and smell a sulphury stench!

Hydrogen sulfide can be produced during fermentation due to the metabolism of yeast. It's often a result of yeast stress caused by factors such as nutrient deficiencies, too-high fermentation temperatures, or inadequate oxygen levels. Just

like stress can make *you* feel ill, it can negatively impact our little yeast friends as well. To avoid the formation of hydrogen sulfide, it's crucial to maintain a healthy fermentation environment. Start by ensuring that your yeast has access to sufficient nutrients, particularly nitrogen, which is essential for yeast health and metabolism. Additionally, fermenting at the recommended temperature range for your yeast and providing proper aeration during the early stages of fermentation can reduce the risk of hydrogen sulfide formation.

If hydrogen sulfide does develop in your mead, there are measures you can take to remove it. One method is to conduct aeration by gently stirring or racking the mead to introduce oxygen, which can help dissipate the hydrogen sulfide gas. It's important to note that excessive agitation can introduce even more oxygen and potentially lead to oxidization issues, so this should be done carefully and in moderation. Another approach is to use sanitized copper, which can bind with the hydrogen sulfide and remove it from the mead. My favorite method for using copper is to strip the plastic sheath off a solid (non-braided) copper wire, sanitize it, and then hang it from the bung. With your bung and airlock in place and sealed up, you can gently swirl the mead every hour – then simply remove the wire when the smell dissipates. Allow some time for copper particulate to settle on the bottom of the carboy before your next racking.

Very light hydrogen sulfide aromas generally indicate an issue that will “age out” or “off-gas.” In these circumstances, I wouldn’t advise treating the symptom. However, if you’re smelling strong H_2S aromas, you may be heading toward an irrecoverable problem: ethyl mercaptan. This compound comes from a standard reaction of H_2S in fermented beverages and cannot be easily removed – meaning you’re stuck with a mead that tastes and smells like a burnt match. If you believe your H
with oxygenation or copper.

Like always, prevention is the best course, so consistently monitoring and maintaining the health of your yeast throughout fermentation is key.

STALLED FERMENTATION

Stalled fermentation occurs when the yeast activity slows down significantly or halts before all the sugars are fully converted into alcohol. Mead is particularly susceptible to stalls because it generally starts with a low-nitrogen concentration as compared to fruit or grain-based fermentations. There are several factors that can contribute to stalled fermentation, including poor nutrition for the yeast, low ambient fermentation temperatures, excessively high starting gravity (amount of sugar in the initial mixture), and insufficient oxygen levels.

Causes: Nutrient deficiency

To avoid the problem of stalled fermentation, it's important to provide yeast with the necessary nutrients to support their growth and fermentation activity. As discussed previously, yeast require nutrients (nitrogen, vitamins, and minerals) to function optimally. Using yeast nutrients and

energizers specifically designed for mead-making can help prevent nutrient deficiencies and ensure a healthy, steady fermentation process. Additionally, ensuring an appropriate starting gravity can prevent excessive stress on the yeast, allowing them to ferment more efficiently.

For a healthy, stall-resistant fermentation, know your yeast nutrient requirements, recommended fermentation temperature range, and projected alcohol tolerance. Using the right yeast for the job is the first step in avoiding a stall.

Causes: Temperature

Ambient fermentation temperatures play a significant role in mead fermentation. Yeast have temperature ranges at which they perform best – and fermentation activity can raise the temperature in the vessel higher than the ambient temperature in your room.

If the fermentation temperature is too low, yeast activity may slow down or stop altogether. Conversely, if the temperature is too high, it can lead to off-flavors and stressed yeast. Maintaining a consistent and yeast-appropriate fermentation temperature by using temperature control devices, such as a fermentation chamber or heat pad, can help prevent stalled fermentation.

Causes: Self-stabilization

Sugar and alcohol can both impede fermentation. And, of course, alcohol is a much more effective stabilizer than sugar. Sometimes in a mead fermentation, the concentration of sugars and/or alcohol can become such that the yeast can no longer operate. The measurement system for this is called "Delle units," and it is expressed as a ratio of sugar and alcohol that halts fermentation. Too much sugar, too much alcohol, or the right combination of both can cause the yeast to stall out.

Delle units are not something you need to necessarily understand thoroughly as a beginner meadmaker. However, reaching the Delle limit indicates that the yeast has fermented as much sugar as it can, and the alcohol content has reached a level that may be detrimental to the yeast's activity. Accordingly, the fermentation stalls or slows down.

Other than diluting the mead must to re-start fermentation, there is little that can be done about un-sticking a fermentation that has stalled due to reaching its Delle limit.

Remedies

If you happen to find yourself dealing with a stalled fermentation, there are several steps you can take to potentially restart it.

First, double-check the temperature in your must with a sanitized instant read thermometer to ensure it is within the manufacturer’s recommend range. Move it to a cooler or warmer spot if necessary. This may be all you need to get things going again.

If your temperature is good, next check that the yeast is still active by looking for signs of fermentation activity. Do this by taking hydrometer readings for a few days and noting any movement

down in gravity. If the yeast is still viable, you can gently stir the mead to reintroduce oxygen and mobilize any yeast that have begun to go dormant, which can help restart fermentation. Additionally, adding organic yeast nutrients can provide the yeast with the necessary resources to continue fermentation. Avoid inorganic nutrients like DAP and Fermaid K, though, as they can impart off-flavors if the mead cannot be un-stalled.

If these efforts don't yield results, you might consider pitching a fresh batch of yeast to kickstart fermentation once again. Do this by rehydrating the yeast with a rehydration nutrient like Go-Ferm, building up a strong starter full of oxygen, and pitching it into the stalled must. Do this only as a last resort.

If your mead simply cannot be un-stalled, consider stabilizing it and blending it with a dry finished mead to transform it into something you can still enjoy!

FLOATING FRUIT & INGREDIENTS

Managing floating fruit and other ingredients is important to ensure proper extraction of flavors and prevent issues like mold growth. When ingredients like fruit skins float on top of the must, they can become dry and exposed to air, potentially leading to oxidation and off-flavors in the final mead. Additionally, the dry solids on top can create an environment conducive to mold growth if left unattended. Mitigating this issue is as simple as keeping those ingredients wet!

During the early stages of fermentation, gentle and regular mixing, commonly known as "punching the cap," helps submerge the ingredients and keeps them in contact with the liquid. This aids in extracting important color, flavor, tannin, and aroma compounds from the solids. Punching the cap can be done manually by pushing down the floating ingredients with a sanitized spoon or paddle. If your ingredients are in a brewing bag, this is even easier.

However, note that some brewers will recommend weighting down a fruit bag to keep it submerged. This is not necessary and the weights can introduce a vector of infection or other off-flavors to the mead. Just push the bag down once or twice a day for the first week to keep it wet!

In addition to preventing drying, regular mixing also helps discourage mold growth on the exposed solids. Mold thrives in moist environments, and by keeping the solids wet and evenly distributed in the must, you can reduce the risk of mold development. **Mold growth can make your mead unsafe to consume.** After about a week of fermentation, the carbon dioxide concentration in your primary vessel should be high enough to prevent mold growth from forming. At that point, punching the cap becomes less of a priority, and leaving the vessel sealed is a wiser choice.

Dealing with solids in both primary and secondary fermentation involves careful consideration of your goals and techniques. Many meadmakers are only using solid ingredients in primary, then racking only

the liquid portion to the secondary vessel. The aforementioned advice will help avoid any pitfalls in primary – but what about when you want to use fruit, herbs, or spices in secondary?

Secondary is a very different environment. The protective factors of active fermentation and CO_2 production slow down and cease. You'll need to manage how much you open the vessel, any microorganisms that might hitch a ride on your ingredients into the mead, and how long you leave those ingredients in the vessel before transferring to tertiary or bottling/kegging.

Adding ingredients in secondary comes with several questions about the goal:

- Do you want those ingredients to ferment?
- Should you stabilize the mead before adding those ingredients?
- Does each added ingredient need a different exposure time? For example, if adding blueberries and cloves, you might want significantly less exposure to the cloves than the berries.
- Are the ingredients prone to molds, acetobacters, or other forms of spoilage?
- Do you have a plan to prevent oxidization or other spoilage, ie. using inert gas to purge headspace or sulfites to scavenge oxygen?

Generally, after the first week of fermentation, floating ingredients become less and less of a concern. But it is crucial to understand how they impact your process and flavors if you want to avoid floaters becoming a problem.

OAKING (AND OVER-OAKING)

Oak can be a powerful tool for enhancing flavor complexity, texture, and aromatics. There are various ways to introduce oak to mead, each with its own characteristics and considerations. Different types of oak, such as American, French, and Hungarian, can impart unique flavors and nuances to the final mead. Additionally, various methods of oaking, including spirals, cubes, staves, chips, and powder, offer diverse options for achieving desired oak profiles. Every type and form of oak creates a different result.

American oak is known for imparting bold flavors of vanilla, coconut, and sometimes dill or spice. French oak tends to imbue more subtle and complex flavors, such as toasted bread, nuts, and more delicate spice notes. Hungarian oak falls somewhere between American and French oak in terms of flavor profile, sometimes considered a balance between the two. Choosing the type of oak depends on the desired characteristics of the final mead and personal preferences.

Methods of oaking vary in terms of intensity and your control over the oaking process. Oak spirals, cubes, staves, chips, and powder are all popular options. Spirals, cubes, and staves are larger pieces of oak that offer slower and more gradual oak extraction. They can be added directly to the mead during fermentation or aging and provide a longer contact time. Oak chips and powder are smaller pieces that offer quicker oak extraction, making them suitable for shorter contact times.

Smaller pieces mean increased surface area – and a higher potential for over-extraction. Larger pieces provide a more all-around oaking experience that better mimics the barrel-aging process.

To avoid over-oaking a mead, it's important to exercise caution and control over the oaking process. Over-oaking can lead to dominant woody flavors that overpower the mead's natural characteristics. Start with a small amount of oak and taste the mead regularly to monitor its development. You can always add more oak if needed, but it's challenging to remove excess oak influence once it's introduced.

A common approach to preventing over-oaking is to conduct trials with a small sample of mead before making a decision on the final batch. This involves adding a controlled amount of oak and observing the impact over time. Once you're satisfied with the level of oak influence, you can scale up the process for the entire batch. Another technique is to blend meads with varying levels of oak influence to achieve a balanced and harmonious oak profile.

But for the beginner, I'd advise adding the manufacturer's recommended amount of oak and drawing small tasting samples regularly. When you like the flavor, rack the mead to a clean and sanitized vessel to remove the oak.

SPICE MANAGEMENT

Adding spices to mead can infuse unique flavors and aromas for a richer and more complex sensory experience. A variety of spices can be used to impart distinct characteristics to the mead. Common spices include cinnamon, clove, vanilla, juniper, cardamom, and more. The choice of spices depends on the desired flavor profile and the spices' compatibility with the mead's existing characteristics. For example, some people like pairing cinnamon with blueberries. Others love the flavor of cardamom and vanilla. Personally, I think lemongrass and juniper make a lovely pair!

When adding spices to mead, there are several methods to consider. One approach is to create a spice tincture. This involves steeping the desired spices in a neutral alcohol, such as vodka, to extract their flavors and aromas. Then, the infused alcohol can be carefully added to the mead in small increments, allowing for precise control over the level of spice influence. Alternatively, whole spices or ground spices can be added directly to the mead, either during fermentation or aging. Want to crank it up a notch? Try dry toasting spices for a short time to bring out more complex flavors.

To avoid over-spicing the mead, it's crucial to exercise caution and moderation. Spices can have intense and concentrated flavors, so a little goes a long way. Start with a small amount and allow the mead to infuse over time. Taste the mead periodically to monitor the progression of flavors and determine if more spice is needed. Some spices can become more pronounced as the mead ages. Others can diminish slightly during aging. My recommendation would be to err on the side of subtlety – so, if needed, you can add more later.

If you find that you have added too much spice to your mead and it has become overpowering, there are a few steps you can take to address the issue. One approach is to blend the overly spiced mead with an un-spiced batch of the same mead, gradually achieving a more balanced flavor profile. Alternatively, you can dilute the overly spiced mead with any other mead that has not been spiced. Either process can help mellow out the intensity of the spice flavors and create something you can still enjoy – even if it's not what you set out to create.

In cases where the mead is still fermenting, you may have the option to dilute the mead with unfermented grape juice or honey water to reduce the spice concentration. It's important to reiterate that correcting over-spicing can be challenging, so prevention is key. By starting with a conservative amount of spice and conducting taste tests throughout the process, you can avoid overloading the mead with intense spice flavors. For me, this means never adding spices in primary. I prefer the added control of using spices only in secondary.

By selecting compatible spices, using appropriate methods, and practicing moderation, you can achieve a well-balanced and enjoyable final product. Regular tastings and small adjustments are essential to avoiding over-spicing and ensuring that the spice influence enhances, rather than overwhelms, the mead.

BOTTLE BOMBS

"Bottle bombs" are a potentially very dangerous occurrence in homebrewing where a bottle of mead (or any other homebrew beverage) continues to ferment inside the sealed container, leading to a buildup of carbon dioxide gas that can cause the bottle to explode.

Bottle bombs typically happen when a mead is bottled too soon. If the fermentation has not completed (or if the residual sugar levels in the beverage were miscalculated), the remaining yeast can continue consuming the sugars in the sealed bottle, producing excess carbon dioxide. The gas has nowhere to escape to, causing pressure to build up until the bottle's structural integrity is compromised. This catastrophic failure of the glass can cause traumatic injuries and a big mess – if not properly managed.

To avoid bottle bombs, it's essential to ensure that the fermentation process is complete before bottling. This includes checking that the gravity of the mead has stabilized, which indicates that most of the sugars have been converted to alcohol. Use a hydrometer to confirm that fermentation has finished – and check to make sure that your reading is stable across several days of gravity readings. Additionally, make sure that the beverage has cleared and that no visible signs of active fermentation (bubbling) are present. This will help prevent any residual yeast from causing continued fermentation in the bottle.

One of the surest ways to eliminate the risk of bottle bombs is to stabilize the mead either chemically or through pasteurization. These processes are covered in Chapter Two of this book. When done

properly, refermentation in the bottle should not be possible for a stabilized mead.

It is important to note that stabilizers used in meadmaking, such as potassium sorbate and potassium metabisulphite, do have a finite shelf life that should be taken into consideration. Generally, these stabilizers are expected to remain effective for about 1 to 2 years when stored properly. To increase their shelf life, it is important to store them in a cool, dry, and dark environment, away from direct sunlight, heat, and moisture. Vacuum-sealing the containers, keeping the contents dry, and avoiding contamination can also be important factors in prolonging their effectiveness. Personally, I mark the date I purchased the stabilizers on the jars I use to store them in – and if there is anything left in the jar after a year, I throw it out.

Using fresh and trusted stabilizers in your mead is vital to ensuring your desired outcomes in terms of taste, aroma, and stability. Expired or ineffective stabilizers might fail to properly inhibit unwanted fermentation, spoilage, or oxidization, impairing the quality of the final product. As your stabilizers degrade over time, their lost potency may fail to provide the necessary protection to your mead, leading to off-flavors, off-aromas, or the dreaded bottle bomb. By regularly checking expiration dates, practicing proper storage, and using reputable sources for your stabilizers, you can help guarantee that your meadmaking efforts are supported by reliable and effective tools.

But what if I do have bottle bombs?
If you suspect that you have a potential bottle bomb in your collection, it's important to take immediate action to prevent injury or damage. Handle the bottles with extreme caution – wear safety glasses and gloves – and move them to a safe and isolated area, preferably in a container that can contain any potential explosion (like a plastic cooler). Once safely contained, carefully release the pressure by opening the bottles in a controlled manner. Do this in an outdoor area and point the bottles away from your face and body to minimize the risk of injury.

CLEANING GEAR
What’s that flaky spot in the bottom of my carboy? Should I be worried about that? Or what about that deep scratch I nicked on the inside of my bucket? Can I even clean that?

Proper cleaning of your gear is nearly as important as sanitization when it comes to the quality and safety of your brews. Carboys, brushes, tubing, siphons, spoons, and other equipment need to be thoroughly cleaned to remove residue and contaminants before each use. There are several effective cleaning methods and common types of cleaners that we can use to ensure our gear is in top condition. Two commonly used types of cleaners are alkaline and oxygen-based cleaners.

Alkaline cleaners are designed to break down organic materials like sugars, proteins, and fats. They are effective for removing stubborn residue from carboys, brushes, and utensils. The most popular commercial example is sold under the

brand PBW.

Oxygen-based cleaners, on the other hand, contain active oxygen compounds that can effectively lift stains and buildup from equipment. The most popular choice for homebrewers is OxyClean Free. Do not use regular OxyClean (or similar cleaners) that contain fragrances.

All cleaners should be rinsed away thoroughly after use. It's important to note that, while these cleaners are powerful, they are not a substitute for sanitizing agents.

In the meadmaking world, we are careful to differentiate between cleaning and sanitizing. Cleaning involves physically removing visible dirt, residue, and contaminants from equipment surfaces. Sanitizing, on the other hand, is the process of killing or inhibiting the growth of microorganisms that can spoil your brew or lead to contamination. After thorough cleaning, equipment should be sanitized using appropriate sanitizers, such as Iodophor, StarSan, or the various other homebrewing-specific solutions, to ensure a safe brewing environment.

Using a proper cleaning solution, and following the manufacturer’s guidance, it should be fairly easy to clean any build-up off of your gear. When cleaning homebrewing equipment, it's vital to avoid abrasive cleaning materials on plastics. Abrasives like steel wool or harsh scrubbers can scratch plastic surfaces, creating tiny grooves where contaminants can hide and flourish, even after thorough cleaning. These scratches can become breeding grounds for bacteria, yeast, and other microorganisms, leading to potential contamination and off-flavors in your brews. Instead, opt for soft brushes, nylon scrub pads, or cleaning cloths that won't damage the equipment.

And if you do have gouges or scratches in something like a plastic bucket, tread carefully. That bucket is not necessarily a lost cause, but it could eventually be an infection vector for a future batch. When in doubt, throw it out. Honey is expensive, but buckets and spoons are not.

SAYING GOODBYE TO YOUR GEAR

Knowing when to retire certain homebrewing gear is an important aspect of maintaining the quality and safety of your brewing process. Just like any hobby, replacing equipment is common and expected. Over time, wear and tear, staining, and deterioration can compromise the effectiveness of your gear, impacting the final products of your homebrews. Regularly assessing the condition of your equipment and being proactive about replacements will lend to a smoother and more enjoyable long-term brewing experience.

Certain items, such as tubing, siphons, and brushes, should be replaced regularly due to their exposure to the brewing environment and the nature of their use. Tubing, especially if made from plastic, can become discolored and stained by the ingredients and compounds in your brew. It is also notoriously difficult to clean. Staining can indicate that the tubing is becoming porous, making it difficult to clean and increasing the risk of contamination.

Siphons are often exposed to yeast, sediment, and other potentially harmful substances that can cause scratches and microorganisms to accumulate over time, negatively impacting the quality of your mead. Brushes used for cleaning equipment can wear out or develop bristle damage that makes them less effective in removing residues and contaminants. Well-cared-for equipment can last for years – but nothing lasts forever.

By regularly assessing your equipment, you can make informed decisions about replacements. In replacing items that have outlived their usefulness, you can ensure that your brewing process remains efficient, sanitary, and consistent – ultimately leading to better results in your homebrews.

FINALLY, THE DREADED MOLD
The biggest boogey-man of them all!

Mold is a potential threat that can infect a batch of homemade mead, leading to catastrophic spoilage and rendering the mead unsafe for consumption. Mold spores are present in the air, and if they come into contact with a batch of mead, they can grow and multiply in the right conditions of warmth, moisture, and oxygen exposure. **Mold can impart off-flavors, unpleasant aromas, and pose health risks to anyone consuming the mead.**

Identifying mold in homemade mead is critical for preventing the consumption of contaminated drinks. Mold growth often appears as colored fuzzy patches, irregular spots, or discoloration on the surface of the mead or inside the container. These patches can range in color from white and green to black or red, depending on the type of mold.

Unlike a yeast or bacteria-generated pellicle, which is not necessarily dangerous, mold growth tends to be more irregular, uneven, and distinctly furry. A non-mold pellicle is often a thin, delicate film that develops on the surface of the liquid. It can vary in appearance, ranging from a thin, wispy layer to a more substantial, wrinkled membrane. The color of the pellicle can range from white to beige, and even shades of pink or gray. Usually, a mead that has formed a pellicle is still safe to drink, though it may not taste or smell very good. And often, it will turn the mead funky or sour.

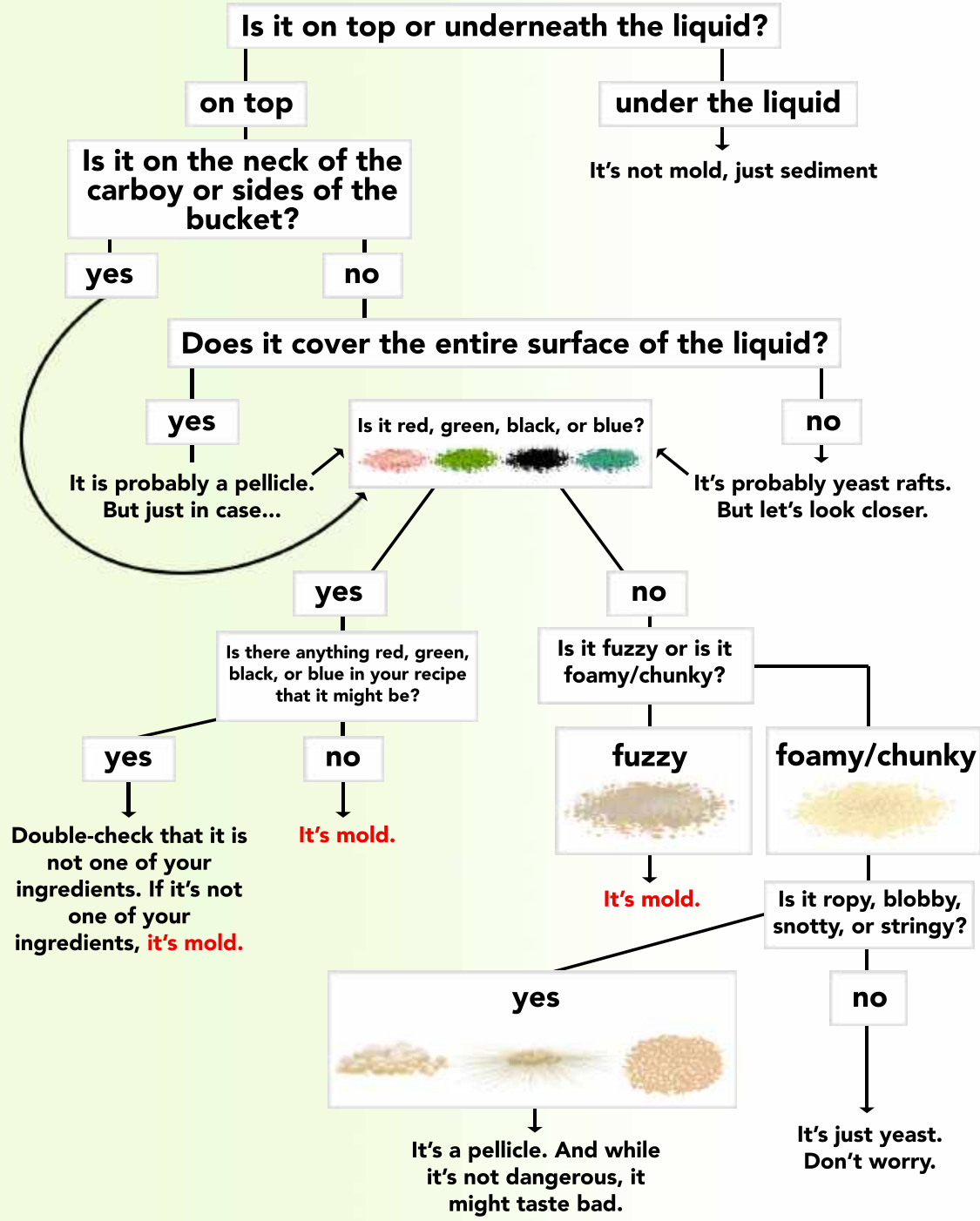
Brewing yeasts, like beer and wine yeasts, don't create a pellicle. Brettanomyces yeast is a notable exception, but is rarely used in meadmaking. Beer and wine yeasts will create rafts and foam on top of the mead – sometimes called "krausen." Newer meadmakers may have difficulty determining the difference between mold, pellicles, or standard krausen. Odds are, almost every time, what you're seeing is normal krausen. With proper cleaning and sanitization, mold infections are rare. But if you find yourself questioning a growth on your mead, snap a clear photo and post it to a mead or winemaking group online. Someone will be able to help you identify it.

Drinking any batch of mead infected with mold can be dangerous for several reasons. Firstly, molds can produce mycotoxins, which are harmful compounds that can lead to various health issues if ingested. Consuming moldy mead can cause

stomach discomfort, allergic reactions, or even serious health problems, depending on the type of mold and its toxins. Secondly, mold contamination alters the taste, aroma, and overall quality of the mead, rendering it unpalatable and disappointing to enjoy. As a result, it's recommended to discard any batch of mead that shows signs of mold contamination to ensure your safety. Regular sanitation practices, proper airlock usage, and vigilant monitoring can help prevent mold growth and safeguard the quality of your meads.

Follow the flow chart on this page if you believe you have an infected batch of mead. A discerning eye should be able to determine whether you have something dangerous or relatively benign growing on your mead.

Is it mold?



CHAPTER SIX

LEVELING UP

Most meadmakers and home winemakers begin their brewing journey with one-gallon batches. Sometimes this involves a two-gallon bucket for use with fruit, but generally it means a pair of one-gallon demijohns and gear scaled for the task.

But is one-gallon the right approach? For some, yes. For others, it might soon be time to graduate.

Small batches can definitely help keep costs down. For those not interested in repeatability of their batches, one gallon quantities leave plenty of room for experimentation with styles, honey varietals, ABVs, and yeast strains without too much commitment from the brewer themselves. A one-gallon jug is easy to carry around, quick to rack, and takes little effort to bottle. However, there are distinct disadvantages to brewing such small batches.

Consider Five-Gallon Batches Instead

New homebrewers often like to dip their toes in the water. It's not too difficult to get ahold of a one-gallon glass jug – apple juice and cider are regularly packaged in them these days. Airlocks are cheap. Little auto-siphons are pretty easy to pick up as well. However, over time, you can sink a lot of money into a setup specifically catered to brewing micro-batches. But there are some distinct –and glaring– disadvantages to structuring your entire brew setup around one-gallon quantities. And for these reasons, I implore you to start with five-gallon batches...

One gallon is just hard to work with

Don't get me wrong – I do micro-batches as recipe experiments from time-to-time. So I'm fully aware of the challenges with such small quantities. The most significant issues have been:

- The jug tipping over during racking due to the weight of the racking system
- The loss of a significant portion of the product when racking off the lees
- Finding a place that a jug with a bubbler airlock can fit under
- Math to do recipe conversions – more on this later

A five-gallon batch may be burdensome to move around, but the weight and quantity are more an asset than a detriment. And if you're already going to be struggling to find a place to stick it while it ferments and ages, you might as well go all the way and dedicate a closet floor. Life is simple in the five-gallon world.

More to Love

When I have made small one-gallon batches, they disappear almost as fast as I bottle them. Within a month or two, there's none left to enjoy. And that's part of the fun – tasting it every week or two to see how it changes. But a one-gallon batch will net you four wine bottles worth (if you're careful on racking). It takes a lot of self-control to age one of so few bottles for any meaningful amount of time. With a five-gallon batch, this concern disappears. Even if you drink a bottle a month, you'll have enough to last for a couple of years!

Tracking the change of your product over such a breadth of time is incredibly rewarding and means so much more for your self-improvement as a brewer.

It's a lot easier to deal with fruit

Home vintners and meadmakers often love experimenting with fruit additions. But let's be real – putting fruit into a one-gallon jug is a real pain. It's also a pain to put it in a carboy – but the wider neck is advantageous for getting it all back out. Even better, five and six-gallon fermentation buckets work great for both primary and secondary fruit additions. Then you can rack into a five-gallon carboy for aging and fining. Some one-gallon brewers will use small food-grade icing pails for the primary. These pails are not ideal for this purpose – they're flimsy and don't have pre-bored holes for airlocks. For the cost of boring a hole and seating an O-ring grommet, why not just start with an inexpensive bucket made for this purpose? Better yet – I've done primary for one-gallon batches in a five-gallon bucket with no adverse effects. It's versatile, inexpensive, and smart.

It's the unofficial standard

Since homebrewers settled on glass carboys for fermentation, five-gallon batches have become the standard for most recipes and additives. Yeasts and fining agents are typically sold in portions for treating five to six gallons. Equipment and recipes are most commonly made for five-gallon batches. So, when brewing in one-gallon batches, this may require all sorts of math to convert proportions for 1/5 the volume. It may also need some non-standard equipment and practices to achieve good results. Because of this standard, five-gallon brewing is much simpler for the beginner brewer.

Micro-batches have their place – especially when playing around with recipes and experiments. But for your tried-and-true brews, make the switch to five. You'll have a simpler time and plenty more to enjoy. Invest!

BENEFITS OF BULK AGING

Homebrewing of mead has gained a lot of traction in the last few years. Is mead the new trendy beverage? Is honey water more highbrow than fruit- or malt-based musts? Whatever the reason, it seems like mead is here to stay. Many YouTube channels and internet forums advocate for various methods of making meads that are fast ferments and quick to hit the table.

But hold on there a minute – don't wines (mead technically being a honey wine) need some time to age? Hipster homebrewers might have you believe otherwise. But those of us who've been around the brewing block a while tend to disagree. The aging debate is truly a house divided, and admittedly I've heard both sides from longtime and beginner brewers alike. I'm a big believer in aging of your meads – particularly higher-ABV brews. Here's why:

A Moment of Clarity

"Looks aren't everything!" you might say. But I disagree – there is a certain spit and polish in serving up a crystal-clear brewed beverage. Young mead suffers from a lot of haze in its early days. This foamy fog is comprised of live yeasts, dead yeast, wax, and other fermentation byproducts held in suspension. Some of them taste bad. Others can give you smelly gas and indigestion. Aging gives the mead some time to drop these particulates out of suspension so that the leftover liquid will be clear and untainted. In a lot of cases, this doesn't even

take long – especially if you cold crash your mead at 33-40F for a few days in the fridge. Appearances can be deceiving, so take a little time for transparency and age your mead!

Bulk Up Your Complexity

No one is quite sure why time creates more complexity in meads – but it certainly does. And depending on the ingredients, more time in the bottle can make for exponentially complex flavors. Theories on how aging works have to do with everything from tidal forces to simple and natural molecular bonding. Whatever the case, leaving mead to sit does something. If you've made a fruit mead (melomel), those added organic compounds may leap to life in as little as 6 months to a year. Some of the best brews I've made have been the ones I forgot about in the dark corner of a closet only to rediscover in their prime. Let your mead live up to its full potential. Let it live a little longer.

Amp Up Your Quantity

"But I only made a gallon! I want to try it now!" There's a reason so many of us moved up to 5 and 6-gallon batches early on in our brewventures. The more you make, the longer you get to enjoy it in moderation. You'll be able to see how a bottle corked a month ago changes to become the bottle corked five years ago. These lessons help you improve your brewing practices, procedures, and recipes. Aging your mead gives you an impetus to make more and build a stockpile – a cellar of sorts. Soon you'll come to look forward to the bigger investment in equipment and ingredients because the fruits of your labor go so much farther. And as a bonus – you'll always have a gift readily available for a friend or family member who appreciates a delectable drink!

The Benefits of Bulk

Another reason to make a lot of mead at once is that you can assert more consistency throughout your batch. You might've heard of "bulk aging" – the process of leaving your entire brew in a single vessel right up until you're ready to drink it. Aging mead in bulk means that the whole batch will be a much more consistent product across each of the bottles. Say you make one gallon and bottle it as soon as it is clear. Each bottle may respond to its environment a little differently. One may get too much light. Another may get too warm. Another may end up in your fridge for a month only to be taken out and placed back with the others. There are a ton of variable scenarios when you're juggling four 750ml bottles.

Now imagine you have 5 gallons of blueberry melomel. You pitch in some toasted oak chips for it to age on. That five-gallon carboy is staying firmly put somewhere. You can easily cover it in a heavy blanket and stash it away. A year or two later, you can pull it out and bottle it – and every bottle will have aged exactly the same. The whole batch will be both ready to drink and have flavor and complexity that is consistent across every single bottle!

Your Friends Will Notice!

If you end up gifting a bottle – your friends will notice if your mead is young. Young mead tastes "hot" due to fusel alcohols that have not become muted. The effects of fermentation persist in a batch for some time. Acids are prominent. Aromas are pronounced. Some CO_2 may still be present – which carries volatile compounds right into your olfactory nerves. Your friends will grit their teeth and force a smile, while writing-off homebrew in their liquor lineup. Serving friends young brews may turn them away from your hobby. They'll come to believe homemade fermentations simply can't be as good as those from established brewhouses. You, a proud mead mama or papa, are willing to look past these flaws. It is your baby after all. Don't serve sour toot-juice to your friends. Let your mead age, clear out, and mellow. Bottle it when it tastes perfect. Your friends will love you for it – and compliments will be sincere!

You're Not in a Rush

Let's get real for a second. Liquor stores are everywhere. Even in Oklahoma, we have wine in grocery stores now. Incredible intoxicants are always within reach. So you shouldn't be in a rush to drink your mead before it's ready. I know, I know – it's tough to find *good* mead at a retail establishment. But young mead is typically not good mead (except in the case of hydromels). You spent a lot of time and money to make your meads – now let it spend some time becoming perfect for you. Brewing dynamo Charlie Papazian coined the term "relax, don't worry, have a homebrew" in his popular book *The Complete Joy of Home Brewing*. If you don't have a homebrew on hand, grab a nice bottle of red from your local wine shop and sip on that until your mead has blossomed. If you brew a big batch, let it clear, and give it some time to mature, you'll be glad you waited. You can't ***do the most*** if you're in a rush!

THE ART OF BALANCE

The hard truth is that it is quite difficult to make a mead that appeals to every palate – especially when it comes to the barebones traditional mead. At some point we all come to the shared reality that different people like different things. I hate cilantro. A good friend of mine cannot stomach eggs cooked *any* which way. So, it is no surprise that, when confronted with a concoction purely reliant on honey, water, and yeast – sometimes the final result will be a delight for some and a dud for others. Other mead styles can be much more forgiving: a melomel, for example, can win favor with big juicy flavors and a rich tannin profile. In a way, it might even feel like cheating.

In my decade-plus of brewing experience I have come to learn that traditional mead is one of those things that people either love or hate… or they *tolerate*. When I made my first mead many years ago (a traditional mead), I followed all the best practices I could find in my research. I brewed it up just like I would for my country fruit wines. But no matter what, every time I opened a bottle over the course of 18 months - I hated it every time. I tried the most popular brand of commercial mead at the time and found that I didn't like that either. I couldn't even enjoy it with the included mulling spices. I wondered if I just didn't like mead.

Flash forward a few years, and I felt like I had conquered country fruit wine making. I had followed the advice of the late Jack Keller. I'd read a ton of books. And I felt like I was making truly great wines. I wanted a new challenge. And the new challenge ended up being… mead.

I felt compelled to revisit my mead making failures and figure out how to do this well. That's when I came to learn that some of the tools in a winemaker's kit are almost *more* important in making mead at home than they are in making wines. Particularly: balancing acids and tannin.

In a lot of country fruit wine recipes, you can get away without adding balancing amendments and instead rely on the acids inherent to the fruit, as well as the skins, seeds, and stems for tannins. With a bit of time and care, you will mostly come away with a pretty palatable brew.

But in making a traditional mead, where you're just talking about honey, water, and yeast, it can be really difficult to find your area of balance in the flavor profile. Hardest can be locking in the flavor profile that suits your individual palate. You may prefer something more astringent than the average – or something more sweet or dry. Maybe you prefer a round acid – or a sharp, fresh,

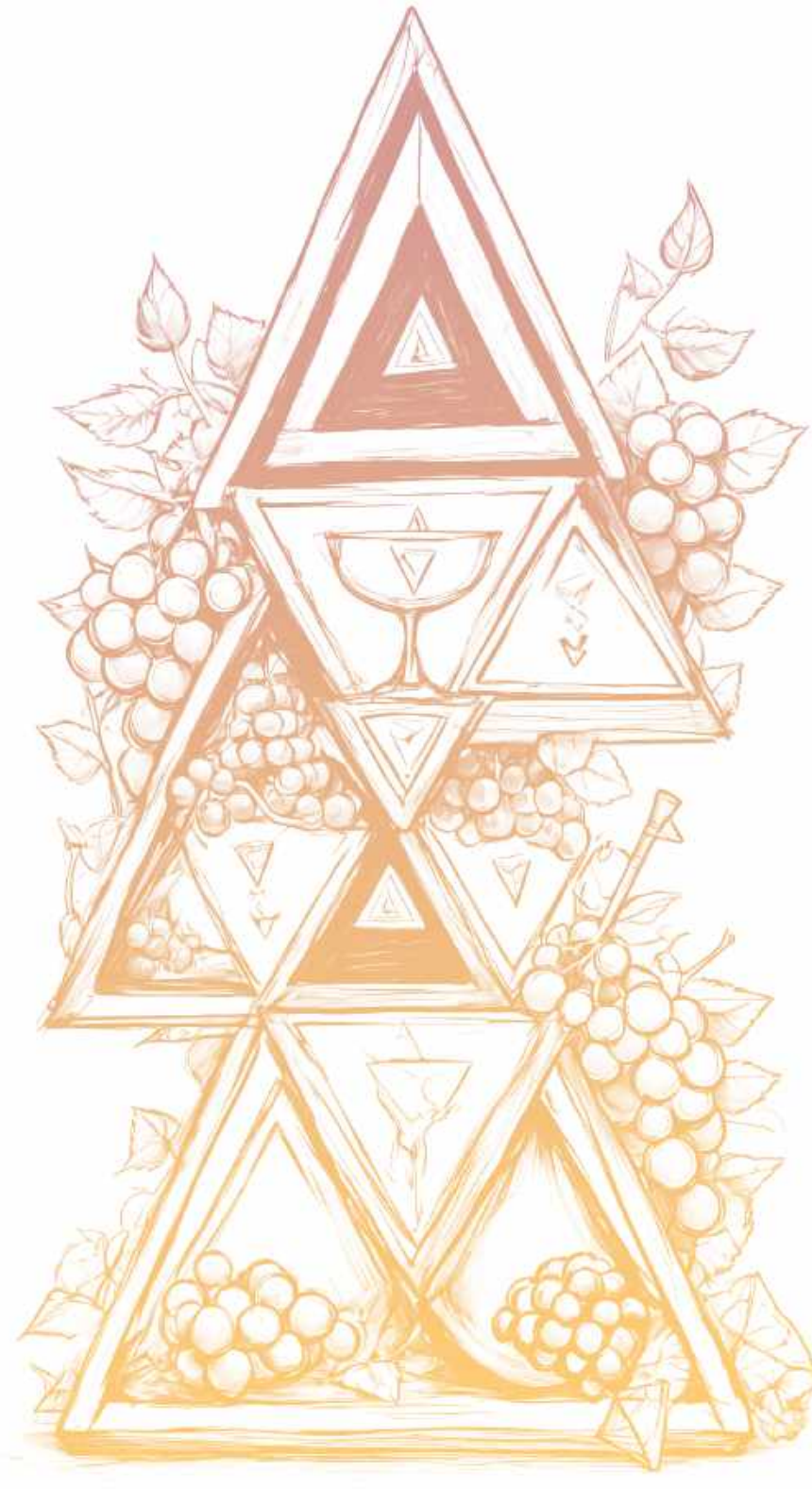
These facets are why the elements of balance in a traditional mead are so crucial to understand. Honey, water, and yeast are great on their own. But they can be exceptional with just some minor tweaks of the balance profile.

You'll find my recipe for my perfect traditional mead at the beginning of our recipes section. But your palate may differ!

I like my traditional mead a little bit on the lighter side. In my older age, I can appreciate big, bold meads as much as the next person. But for my regular sippers, I prefer hydromels or session meads. So even in a traditional mead, I like to keep the alcohol content a little bit lower – around the 11% to 13% ABV range.

Honey choice is crucial for a traditional mead. Some honeys have a really robust character. Others are lighter, fruity, and floral. One of my favorites to play with is buckwheat honey, because it's a rich, malty, complex, and interesting honey. However, for traditional mead I prefer something a little bit fruitier like orange or blueberry blossom honeys.

The three legs of the “balance stool” are tannin, acid, and sweetness. If any leg is too long or too short, the balance of the whole mead will be off. Learning to balance a mead is like learning to play piano – it takes a lot of time, practice, and patience. And, eventually, you learn that the music you play can get more and more complex as you level up your skills. You may find that, just as you feel like you’ve perfected balance, you unlock a whole new plane of flavor and aromatics to master! Important to note: the balance trifecta doesn’t apply only to traditional meads, but to *all* meads.



TANNIN

Tannin is often the most difficult element for beginner brewers to build a palate for. Tannin can be tough to describe and often it is difficut to sense unless it's overpowering. Typically, just enough tannin provides a nice round mouthfeel with a base of support for your other flavors. But too much tannin brings on a mouth-sucking astringency that can be very offensive.

Tannin comes in the form of polyphenols: naturally occurring molecules inherent to plants. They're in fruit skins, stems, leaves, and wood. In mead, tannins build body, add astringency, and can also help with the sensation of dryness on the palate. You can overdo tannin – and if you do, it can often be hard, if not impossible, to remove it.

Brewers new and experienced can find it difficult to choose the right source of tannin for our brews. For a traditional mead, I prefer powdered tannin because it's so simple and doesn't contribute flavor in the way that oak or raisins do. Powdered tannin is easy to add, and it brings a consistent tannin element to a mead from batch to batch. For certain honeys or certain acid profiles you might prefer oak, fruit skins, or even tea over powdered tannin.

Tannin can be difficult to interpret on the palate, so I recommend practicing identifying it. Plus, tasting a variety of meads and wines to identify tannin is a fun group exercise!

Tannin is sometimes best adjusted in secondary once you can determine the mead's true potential. Tannin added in primary will help with clarity, though.

Powdered tannin generally takes about two to three weeks to extract, and even longer to polymerize. If you're using oak, it can sometimes take less or more time depending on what form and variety of oak you're using.

Oak is available in a variety of forms:

- Powder
- Chips
- Staves
- Cubes/orbs
- Spirals
- Barrels

Oak will also be available in a range of toasts, from completely untoasted to dark toast. Extraction rate and level of toast must be taken into account when choosing the right oak for your mead.

Important note: Powdered wine tannin can take 6-8 weeks to polymerize, which will give you your final sense of the tannin content. Always give powdered tannin time after adding it, and taste it before bottling to ensure the tannin level is where you'd like it to be.

ACID

Like tannin, acid is also naturally occurring. It is obviously present in fruits, and typically comes in the forms of citric, tartaric, or malic acid. You can introduce acidity through fruit or juices – or via powdered forms of the same acids, which are available at your local homebrew store.

Acid is a versatile element of balance that can transform a mead simply and inexpensively. Additionally, there is a lot of room to play within the different acid profiles. Just like with tannin, you can overdo it. Also, some yeasts and bacteria can metabolize certain acids – or produce certain acids (like lactic acid). So, always be careful about what active microbes are in your mead!

Sort of old school, acid blend is one way that home wine makers will often balance the acid profile on their wines. Acid blend is set up to mimic the median acid profile of grapes. It contains citric, malic, and tartaric acids.

Malic acid is a dominant acid in grapes and apples. It is a round, rich acid. Citric acid, as you probably know, is very common in citrus fruits. Its profile gives a bright pop of freshness.

For my traditional meads and session meads, I like to balance with both citric and malic acid.

There is a caveat to citric acid – it is used by some bacteria for their metabolism, so you want to make sure that all of your equipment is sanitized with a no rinse sanitizer like Star San. If you're adding citric acid in primary, there's a small chance that you're feeding a bacterial culture if it has found its way in there. Be wise, sanitize.

One thing to note about malic acid is that it can also be metabolized. Some yeasts, like 71B, can use the malo-ethanolic pathway to convert some of the malic acid in your brew into ethanol. Bacterial cultures including malolactic fermentation cultures can convert all of your malic acid into lactic acid – which will really smooth out the mead's acid profile. You want to be aware of the yeast and microbes that are in your mead and how they're going to interact with your acids if you're adding them in primary.

The rule of thumb is generally that you only want to add your acids in primary if you trust your recipe and know your fermentation microorganisms. If you're unsure about the acid profile you want in your traditional mead, it's always best to amend your acids in secondary, similar to how you would treat tannin.

SWEETNESS

Sweetness can come from fermentable sugars, non-fermentable sugars, artificial sweeteners, or non-fermentable sweeteners. It can even be *perceived* sweetness. There are a lot of different ways to add sweetness to a brew. One of the things I like about using Lutra kveik in meads is that it doesn't necessarily need to be back sweetened. Lutra leaves just enough perceptible sweetness that it is plenty for my palate. That means you don't have to stabilize or pasteurize or brew up to a high alcohol like 17-18 percent until your yeast gives up. This also means you can have a lighter medium-bodied traditional mead that still tastes sweet with no added processes piled on top of what you're already doing.

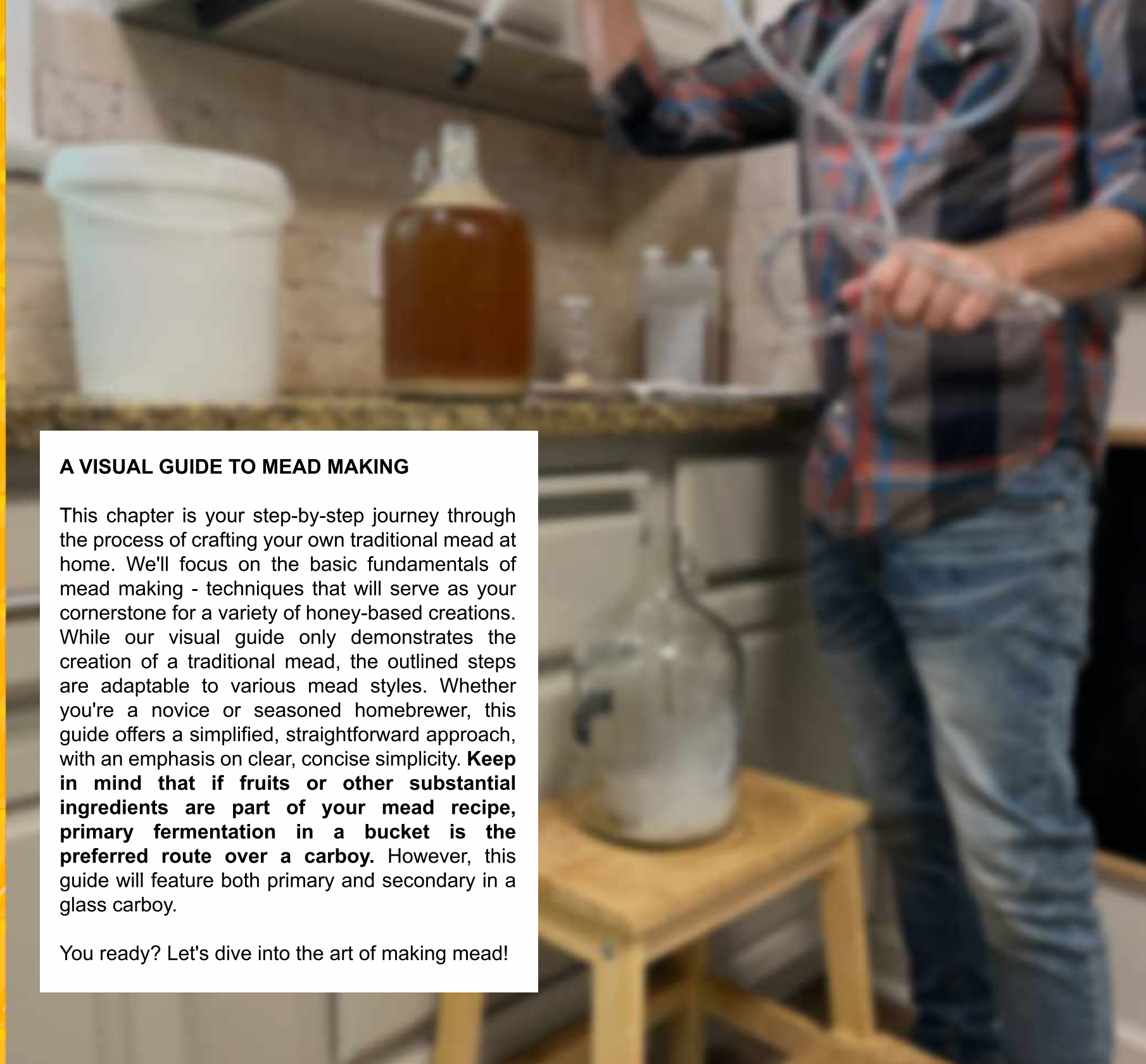
In a traditional mead, sweetness can be really clutch. It is a major balancing element. Sweetness can balance too much acidity, it builds on top of tannin in a good way, and it adds mouthfeel, heft, and richness to a traditional mead – as well as other mead styles. It can enhance a lot of flavors that are in there, like the flavors from caramelized sugars or fruits or other adjuncts. Making sure that you have your tannin, acid, and sweetness all in balance is what's going to make the best brew for your palate. **The perfect traditional mead is the mead that is perfect for you.**

Understanding balance does take a lot of practice – it's really simple for anyone to make a mead. Anyone can make a *drinkable* mead. But I really believe that learning how to tweak those dials to balance your acid, sweetness, and tannin is what can take a *good* traditional mead and make it into a *great* traditional mead.

I spent a lot of time learning how to make mead. I've made a lot of good mead. I've made a lot of terrible mead. I've made some mead that's ended up in the compost bin. But my greatest meads –especially my greatest *traditional* meads– are the ones where all those three elements just lock in perfectly

Is your acid out of whack? Try adding a little bit of back sweetening. Is your brew a little bit watery, and all you taste is the acid and sweetness? Try adding some tannin. Just a few minor modifications might bring the whole thing into balance.

CHAPTER SEVEN



A VISUAL GUIDE TO MEAD MAKING

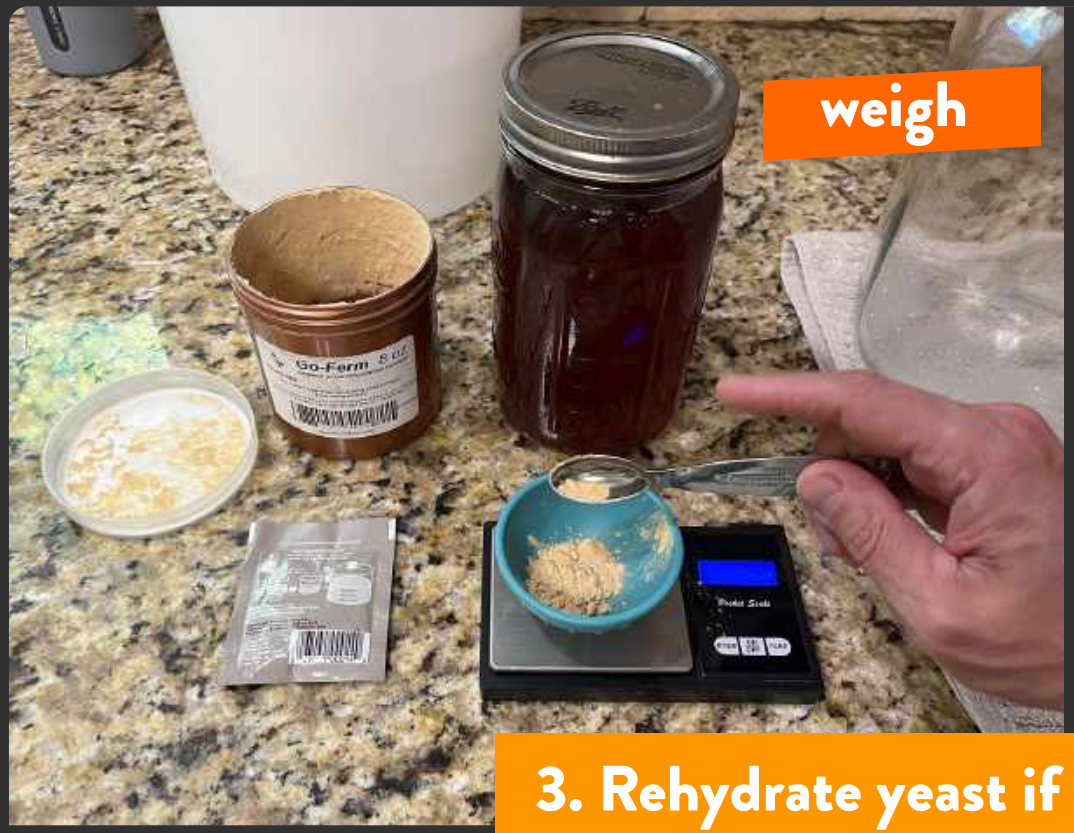
This chapter is your step-by-step journey through the process of crafting your own traditional mead at home. We'll focus on the basic fundamentals of mead making - techniques that will serve as your cornerstone for a variety of honey-based creations. While our visual guide only demonstrates the creation of a traditional mead, the outlined steps are adaptable to various mead styles. Whether you're a novice or seasoned homebrewer, this guide offers a simplified, straightforward approach, with an emphasis on clear, concise simplicity. **Keep in mind that if fruits or other substantial ingredients are part of your mead recipe, primary fermentation in a bucket is the preferred route over a carboy.** However, this guide will feature both primary and secondary in a glass carboy.

You ready? Let's dive into the art of making mead!

Process 1: Mixing it up

1. Mix up your no-rinse sanitizer and get all your gear sanitized.

2. Place gear on a clean, lint-free towel. Prep ingredients and tools.



3. Rehydrate yeast if desired, using a scale to measure nutrient. Stir well.

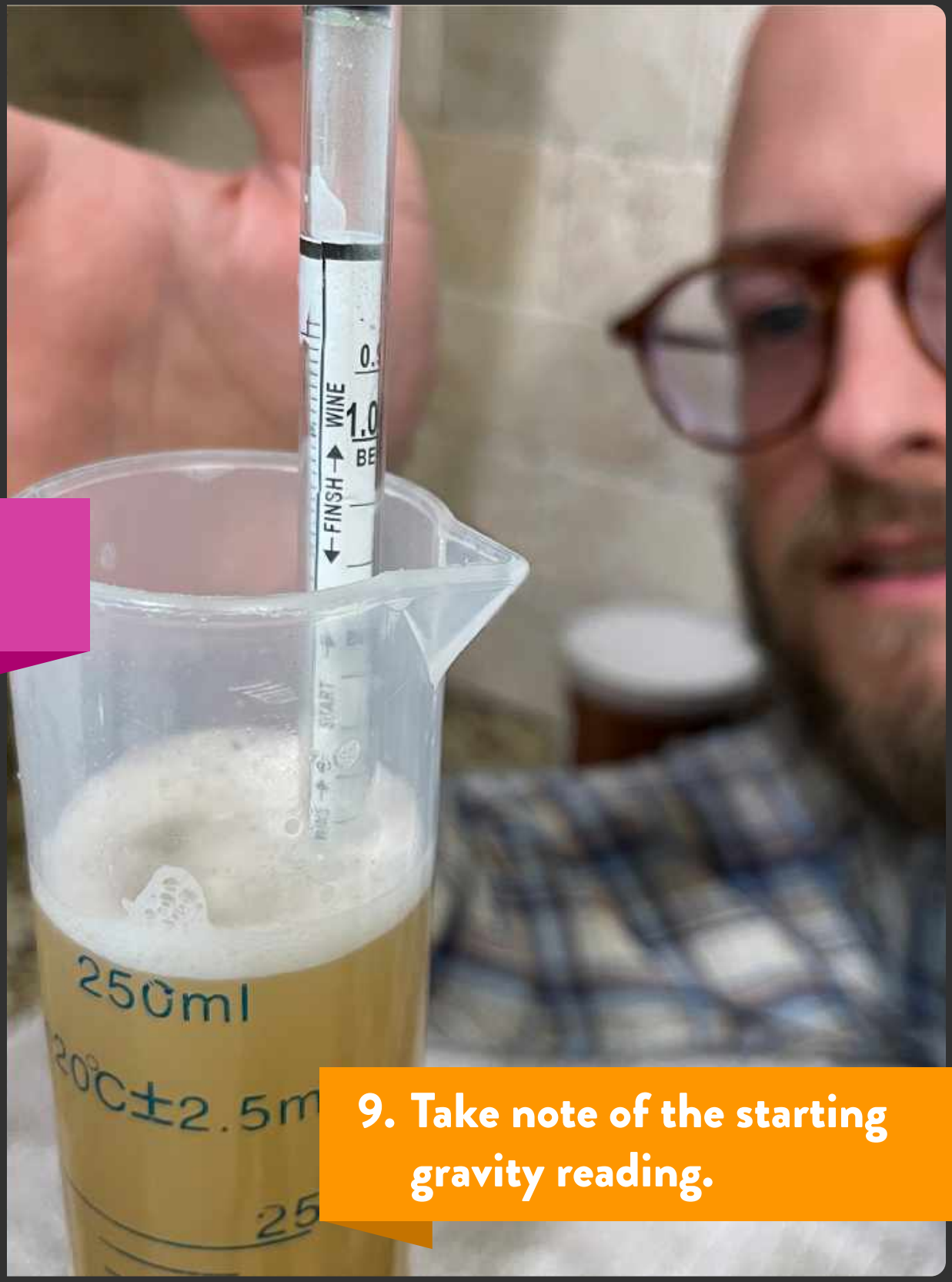
4. Pour your honey in through a sanitized funnel.

5. Fill carboy halfway with water.

6. Place sanitized stopper on top and place thumb over the hole. Shake it up!

7. Fill with water up to the “one gallon” mark.

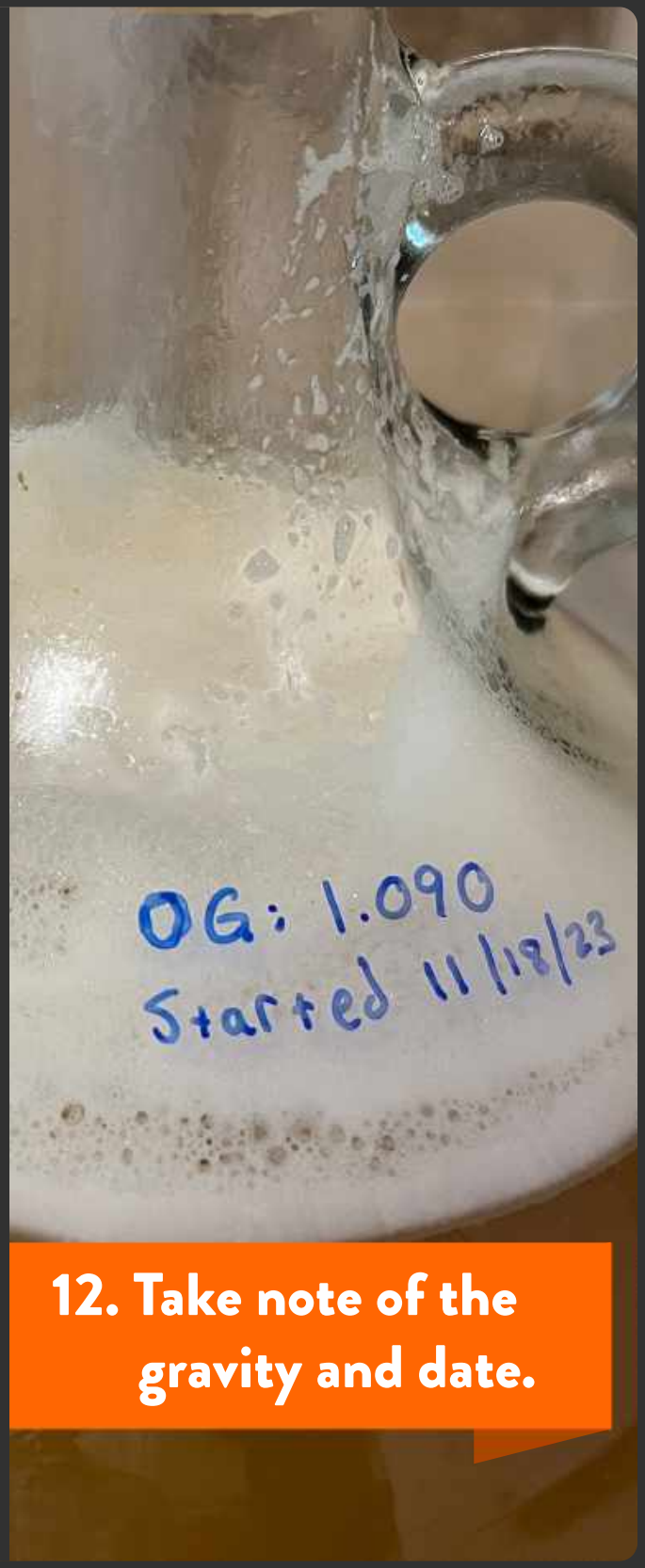
8. Pitch in the yeast, mix well, and pour a hydrometer sample.



9. Take note of the starting gravity reading.

10. Return the sample to the carboy.

11. Fit the airlock on top and fill with sanitizer.



12. Take note of the gravity and date.

Process 2: Nutrient Additions

13. Add your nutrient additions following the schedule in your calculator.

Process 3: Racking
After fermentation finishes

14. Sanitize a carboy, tubing, and siphon.

15. Place the siphon in the mead and pump to begin the transfer.

Process 4: Bottling

After the mead clears

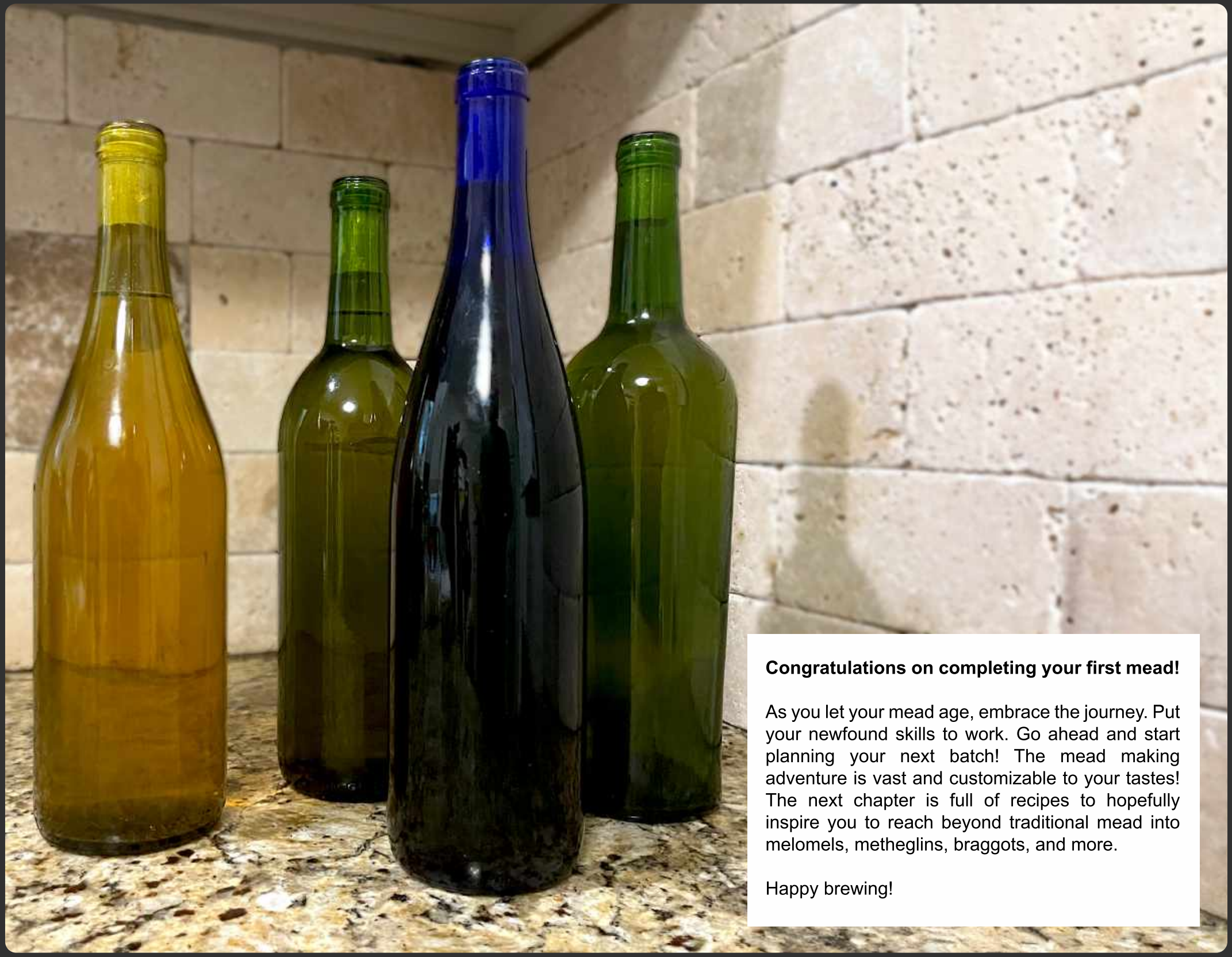
16. Sanitize a siphon, bottles, bottling wand, and corks. Insert wand into the tubing.

When you pull the wand out, the mead will be at the perfect level for your cork!

17. Start your siphon while pressing down on the wand to open the valve. Fill bottles to the top then remove the wand.

18. Place a cork into the corker. Ensure it is centered.

19. Place corker on the neck of the bottle and press down firmly on the handles.



Congratulations on completing your first mead!

As you let your mead age, embrace the journey. Put your newfound skills to work. Go ahead and start planning your next batch! The mead making adventure is vast and customizable to your tastes! The next chapter is full of recipes to hopefully inspire you to reach beyond traditional mead into melomels, metheglins, braggots, and more.

Happy brewing!

CHAPTER EIGHT

MY FAVORITE SIMPLE RECIPES

This is it: your gateway to a collection of 1-gallon mead masterpieces, simplified some from the original creations in my personal repertoire. Each recipe has been carefully crafted for ease and accessibility, with the flexibility to scale up to 5 gallons for those ambitious brew days.

Scaling Up

To transform your 1-gallon batch into a 5-gallon adventure, simply multiply every ingredient by 5 (except for the yeast, use a whole packet regardless of batch size).

Priming Sugar

For sparkling meads, priming sugar isn't listed as an ingredient in the ingredients list. Instead, follow our general rule: 1 teaspoon of table sugar per 12 oz bottle for that perfect effervescence.

Erythritol & Honey

For sparkling drinks, we recommend erythritol as a nonfermentable sweetener. In some recipes, you can use honey to backsweeten, particularly if you plan on pasteurizing or otherwise stabilizing a still mead.

ABV Approximations

ABV levels are approximate and can vary based on honey and fruit brix, as well as the formula used for calculations. Keep in mind that the target gravity may not always be apparent on the hydrometer when sugars are locked up in the fruits, as seen in recipes like the session cyser or honey perry. Blending or crushing your fruit might get your hydrometer reading closer, but for most of these recipes, that's not advised.

Recipe Insights

Each recipe comes with information on why it works, what flavors to anticipate, and guidance on how to use it as a foundation for freestyling your creations. Happy brewing!

Traditional Mead

Target Original Gravity: 1.090
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 12%

Serve still and lightly chilled.

Savor the unparalleled pleasure of a nuanced traditional mead – crisp, rich, and steeped in tradition. This golden-hued drink harmonizes honey sweetness and a delicate floral bouquet. As simple as can be, a traditional mead showcases the subtleties of the nectar in bare form. Uncomplicated and thoroughly enjoyable, each sip is a nod to the time-tested art of mead-making.

traditional mead

Ingredients
- 2.5 lbs honey (orange blossom if available)
- 1.5 grams wine tannin
- 0.5 grams malic acid
- 0.5 grams citric acid
- Spring water

Recommended yeast
Lutra kveik or K1-V1116

Recommended SNA (Staggered Nutrient Additions)
- 2 grams Fermaid O at 24 hours
- 1.5 grams Fermaid O at both 48 and 72 hours

Instructions
- Combine primary ingredients and bring volume to 1 gallon with spring water.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions at 24, 48, and 72 hours.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten if desired, or back sweeten using a nonfermentable sweetener.

This is my recommendation for a well-balanced traditional recipe. Yours will probably be similar, but flavor balance is all dependent on your palate. Fruity honey is crucial - and acid balance is important. For orange blossom honey, acid additions with citric and malic acid help to bolster the fruitier flavors in the honey. This practice can be applied to other fruity honeys like blueberry blossom or raspberry blossom.

When in doubt, adjust acid balance in secondary. There is no reason to add your balancing acids in primary unless you trust the recipe to work with your palate. For this reason, you may want to reserve your acid additions for secondary and adjust to taste.

Higher alcohol, drier meads often need extra tannin to balance out the mouthfeel. Powdered wine tannin is often the simplest and most cost-effective way of achieving this. If using the recommended kveik yeast in this mead, be sure to understand kveik's intensive nutrient requirements. One and a half times the typical amount of nutrients may be required to complete fermentation. If using an online calculator, treat kveik as a high nitrogen dependent yeast.

Lutra kveik typically leaves a sensation of sweetness in the finished brew. So, there may be no need to back sweeten, because even fermented dry, it may still taste slightly sweet. If you desire sweetness, refer to the back sweetening section in this book.

Why this recipe works: Lutra kveik is an aggressive yeast that leaves a perceptible sweetness which complements fruity honey.
What we like about it: It's low effort, straight-forward, and easily adaptable for modifications.
Potential changes or additions: Try omitting the powdered tannin in primary and instead using light toasted American oak in secondary. This will provide tannin and an additional layer of character for the brew. Or, if you're feeling adventurous, caramelize some or all of the honey in a very large stockpot for 15 minutes on medium heat, then cool it rapidly with some of your brewing water before adding it to the carboy. This will result in a "bochet" style mead.

Zesty Mead

Target Original Gravity: 1.080
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 11%

Serve still and lightly chilled.

Experience a refreshing twist in this mead infused with the zesty essence of orange, lemon, and lime. This lively brew combines the honeyed warmth of traditional mead with a burst of citrus vibrancy. The bright citrus notes intermingle seamlessly, creating a mead that is both invigorating and slightly unconventional. It's a modern take on mead, with a fresh pop that gives it a character all its own.

zesty mead

Ingredients
- 2.5 lbs wildflower honey
- Zest of half an orange
- Zest of one quarter of a lemon
- Zest and juice of one quarter of a lime
- 0.5 grams wine tannin
- Spring water

Recommended yeast
Lalvin D47 or K1-V1116

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Semi-sweet. For my palate, this means 3 ounces of honey to back sweeten this one-gallon batch. You may want more or less.

Instructions
- Combine primary ingredients and bring volume to 1 gallon with spring water.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten if desired, or back sweeten using a nonfermentable sweetener.

Why this recipe works: The citrus zest and juice, along with the backsweetening, gives this mostly-traditional mead a touch of tropical flair. One might even say it tastes ever-so-slightly like a lime wedge candy.

What we like about it: This recipe uses zest and honey as its dominant flavors. It's not confusing to the senses – it's straightforward and does what it does well.

Potential changes or additions: Consider reserving all the zest for secondary for an enhanced zesty punch!

Important note:

You're using very little of the fruits for this recipe - half an orange, a quarter of both the lemon and lime. There will be lots of zest and juice leftover. Don't discard these - zest and juice freeze very well, and you can use them for the next batches.

When zesting, remember to avoid the white pith, as it can become incredibly bitter!

White Pyment

Target Original Gravity: 1.084
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 11.5%

Serve still and lightly chilled.

Delight in a casual yet flavorful mead crafted from everyday grocery-store ingredients. This mead features a base of white grape juice, lending a fruity foundation to the brew. It is infused with small bits of grapefruit and lemon peel for a slight hint of complexity. The result is a laid-back table mead that combines the familiar notes of white grapes with a zesty twist, making it a perfect companion for relaxed evenings and easy drinking.

white pyment

Ingredients
- 0.9 gallons store brand 100% white grape juice (or) 2 cans white grape juice concentrate (12 ounces each) and water to 0.9 gallons
- 1.2 lbs orange blossom honey
- 1 gram wine tannin
- Thumbnail sized sliver of grapefruit peel
- Thumbnail sized sliver of lemon peel

Recommended yeast
Lalvin D47 or K1-V1116

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Semi-sweet. For my palate, this means 3 ounces of honey to back sweeten this one-gallon batch. You may want more or less.

Instructions
- Place honey, tannin, and citrus peels in carboy. Add a couple cups of grape juice and stir or shake to combine.
- Add remaining grape juice to reach a one-gallon total volume, stir to combine.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten if desired, or back sweeten using a nonfermentable sweetener.

Why this recipe works: Store brand white grape juice is full of aromatics that complement orange blossom honey well. The addition of a small amount of citrus peel takes it up another notch.

What we like about it: Nearly every ingredient is available at your grocery store – and for cheap!

Potential changes or additions: Try swapping the powdered wine tannin (and a portion of your brewing liquid) for one quart of steeped black tea for a simple, complementary, tannin option.

Important note:

Avoid getting any of the white pith in your mead when adding the slivers of citrus peel. The pith is very astringent and can quickly overwhelm your mead.

Red Pyment

Target Original Gravity: 1.083
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 11%

Serve still and room temperature.

Embrace the straightforward charm of a red grape pyment with a subtle twist. This uncomplicated mead is grounded in the rich depth of red grapes for a familiar fruity backbone. Infused with a hint of orange zest, it takes on a moderate citrus accent. This adds a pop of brightness to the already-juicy profile. Another very accessible recipe, this mead makes for a pyment that is mixed up in just minutes - and will be pleasing on the palate.

red pyment

Ingredients
- 0.9 gallons 100% Concord grape juice (or) 2 cans Concord grape juice concentrate (12oz each) and water to 0.9 gallons
- Half an orange worth of zest
- 1.5 lbs honey
- 1 gram wine tannin

Recommended yeast
Lalvin RC212

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Sweet. For my palate, this means 5 ounces of honey to back sweeten this one-gallon batch. You may want more or less.

Instructions
- Place honey, tannin, and orange zest in carboy. Add a couple cups of grape juice and stir or shake to combine.
- Add remaining grape juice to reach a one-gallon total volume, stir to combine.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten if desired, or back sweeten using a nonfermentable sweetener.

Why this recipe works: Concord grape juice is rarely used for winemaking, but it has a rich juiciness that RC212 helps maintain and amplify. The orange zest provides a subtle layer of interest that inexperienced palate may struggle to decipher – but they'll love it just the same.

What we like about it: This is another brew that is readily available at the grocery store, save for your yeast and nutrients.

Potential changes or additions: Try omitting the powdered tannin in primary and instead using dark toasted French oak in secondary. This will provide tannin and an additional layer of character for the brew. Or, skip the orange zest and instead use a couple pinches of cracked black pepper for a bit of zing!

Important notes:

When zesting, remember to avoid the white pith, as it can become incredibly bitter!

This brew may need time to age to really come into its own – don't open them all at once!

Summer Cyser

Target Original Gravity: 1.067
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 9%

Serve still and lightly chilled.

Quench your summer thirst with a full-bodied cyser designed for leisurely sipping. This robust mead, crafted from a blend of honey and apple juice, presents a fusion of sweetness and crisp apple freshness. It delivers a rich, satisfying experience that's perfect for lazy afternoons and warm evenings.

summer cyser

Ingredients
- 0.9 gallons apple juice (or) 2 cans of apple juice concentrate (12 ounces each) and spring water to 0.9 gallons
- 1.25 lbs wildflower or clover honey
- Juice of half of a lemon
- 1 gram wine tannin

Recommended yeast
SafAle US-05

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Semi-sweet. For my palate, this means 3 ounces of honey to back sweeten this one-gallon batch. You may want more or less.

Instructions
- Place honey, tannin, and lemon juice in carboy. Add a couple cups of apple juice and stir or shake to combine.
- Add remaining apple juice to reach a one-gallon total volume, stir to combine.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten if desired, or back sweeten using a nonfermentable sweetener.

Why this recipe works: Apples and honey, both shining together. Some age improves this brew dramatically. But even by three months, it should be perfectly drinkable. Try it with a baklava!

What we like about it: No ingredient outshines another – and the lemon juice is part of that balance. It adds a freshness that meters both the honey and the juiciness of the apple. It's cohesive.

Potential changes or additions: Want to up your game? Try dry-hopping it with a fruity hop like Citra or Calypso at 10 grams in a one gallon batch a week before racking to secondary – and use a tea bag to contain the hops. Or, after primary completes, add a pound of chopped-up apples for two weeks before racking to secondary.

Session Cyser

Target Original Gravity: 1.041
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 5.4%

Serve sparkling and chilled.

Indulge in this lovely apple mead at a nice, low ABV, which makes it ideal for drinking a few pints over an afternoon. Effervescent and light, this sparkling mead blends the sweetness of honey with the crispness of fresh apples, creating a refreshingly approachable profile. A crisp session mead like this cyser offers a sociable alternative for those seeking a lighter mead experience.

session cyser

Ingredients
- 1 lb Honey
- 1 lb Granny Smith apples
- 1 lb Red Delicious apples
- 1 lb Honeycrisp apples
- 0.5 grams wine tannin
- 0.5 grams citric acid
- 1 gram malic acid
- 1 full gallon spring water
- Pectic enzyme (by package instruction)

Recommended yeast
SafAle US-05

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Off-dry. For my palate, this means 3 ounces of erythritol to back sweeten this one-gallon batch.

Instructions
- Core and chop apples. Leave the skins on.
- Combine primary ingredients. Your starting volume will be much larger than one galllon.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest one week.
- Rack off of the fruit to secondary and allow to clear.
- Back sweeten if desired using a nonfermentable sweetener.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: A blend of apples provides a multifaceted punch of apple flavor, made brighter by the slight touch of citric acid.

What we like about it: There is nothing quite as refreshing as a slightly sweet, carbonated apple cider. Brewing this as a cyser adds a lovely layer of lusciousness to the brew.

Potential changes or additions: Play around with the mix of apples – there are some fun varieties out there that can completely reinvent the experience!

Important notes:

Apple weight is prior to coring/seeding.

Use a bucket for primary fermentation! This mead uses a lot of fruit solids, and there is no way it will fit in a one-gallon carboy. A two-gallon bucket or large-mouth fermenter will be the best way to manage so much volume. When racking to secondary, this should easily fill up a one gallon carboy.

Honey Perry

Target Original Gravity: 1.046
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 6%

Serve sparkling and chilled.

Dive into the subtle sophistication of a honey perry, mirroring the approachable flavor profile of a session cyser, but with the luscious essence of pears. Combining the best elements of honey and pears, this crispy mead unfolds with a gentle sweetness and a refreshing brightness. The result is a light and effervescent mead crafted for easy enjoyment on leisurely afternoons - or at social gatherings where guests might prefer something a little bit lighter than a traditional mead or standard wine.

honey perry

Ingredients
- 1.25 lbs honey
- 3 lbs over-ripe mixed varietal pears
- 0.5 grams citric acid
- 1 gram wine tannin
- Spring water
- Pectic enzyme (by package instruction)

Recommended yeast
SafAle US-05

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Off-dry. For my palate, this means 3 ounces of erythritol to back sweeten this one-gallon batch.

Instructions
- Core and chop pears. Leave the skins on.
- Combine primary ingredients. Your starting volume will be much larger than one galllon.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest one week.
- Rack off of the fruit to secondary and allow to clear.
- Back sweeten if desired using a nonfermentable sweetener.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: The pears don't out-compete the honey, making this a honey-forward brew with an "alto section" of pears that sing the high notes in the chorus.

What we like about it: It's crisp and smacks of pear – where sometimes pear brews can fall into the "apple but not quite apple" camp of flavors.

Potential changes or additions: Play with some citrus zest in secondary. Grapefruit zest can be a great complement to the flavor of pears - and a little can go a long way!

Important notes:

Pear weight is prior to coring/seeding.

Use a bucket for primary fermentation! This mead uses a lot of fruit solids, and there is no way it will fit in a one-gallon carboy. A two-gallon bucket or large-mouth fermenter will be the best way to manage so much volume. When racking to secondary, this should easily fill up a one gallon carboy.

The Ace

Target Original Gravity: 1.091
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 12%

Serve still and lightly chilled.

Embark on a journey of deep, robust flavors with an acerglyn that marries the bold notes of dark maple syrup and the intense earthiness of buckwheat honey. This mead, enriched by a sturdy backbone of oak and a zing of orange zest, boasts a complex profile that slowly unfurls itself with each sip. This well-balanced maple mead offers a layered and satisfying experience for those seeking a mead with depth and character. Perfect for whiskey lovers.

"the ace" acerglyn

Primary Ingredients
- 1.25 lbs buckwheat honey
- 25 ounces real maple syrup
- 0.5 grams tannin
- Spring water

Secondary Ingredients
- 0.75 ounces medium toast American oak chips
- Zest of one quarter of an orange
- Stabilize, back sweeten with half pound rich honey (alfalfa or orange blossom recommended)

Recommended yeast
Lalvin QA23

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Sweet. For my palate, this means a half a pound of honey to back-sweeten this one gallon batch.

Instructions
- Place honey, maple syrup, and tannin in carboy. Add a couple cups of water and stir or shake to combine.
- Add remaining water to reach a one-gallon total volume, stir to combine.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Add oak chips and orange zest and allow to rest two weeks.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten to your taste preference using a rich, but not dark, honey.

Why this recipe works: While not inexpensive to brew, this recipe does maximize the fermented flavor of the maple syrup in a way that doesn't necessarily feel like you're burning a $100 bill.

What we like about it: It is maple, rich dark honey, and complexity. If you didn't know there was orange zest in there, you'd be hard-pressed to identify it.

Potential changes or additions: If you don't love vanillin, switch to French oak for a less intense oak profile that still provides the tannic boost this sweet drink requires. And if you fall in love with the delicate zestiness, ramp it up with double the orange zest next time!

Important notes:

There are a lot of different brands and types of maple syrup out there. Use real maple syrup - not pancake syrup, which is usually just flavored HFCS.

I prefer "dark robust" maple syrup from Vermont, but I've had other grades from other regions work out just as well. Maple syrup's terroir comes from the land and the process used to make it. Experiment, and find what you like best!

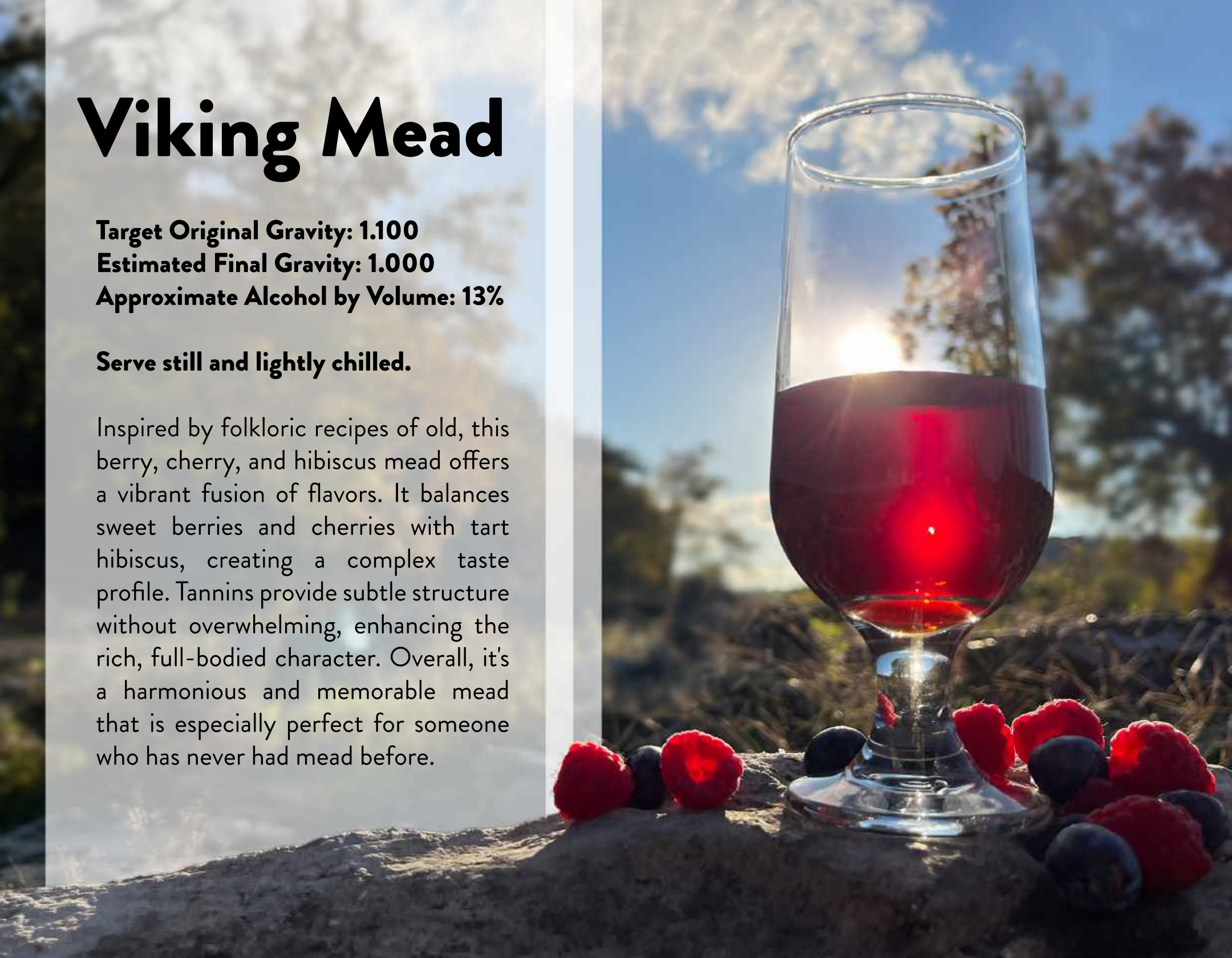
Do not substitute any other yeast. QA23 is prized for its terpene retention - and maple syrup has *hundreds* of terpenes that you don't want to lose!

Viking Mead

Target Original Gravity: 1.100
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 13%

Serve still and lightly chilled.

Inspired by folkloric recipes of old, this berry, cherry, and hibiscus mead offers a vibrant fusion of flavors. It balances sweet berries and cherries with tart hibiscus, creating a complex taste profile. Tannins provide subtle structure without overwhelming, enhancing the rich, full-bodied character. Overall, it's a harmonious and memorable mead that is especially perfect for someone who has never had mead before.



viking mead

Ingredients
- 3 lbs honey
- 1.25 lbs mixed berry blend with tart cherries
- 2.5 ounces dried hibiscus
- Pectic enzyme
- Spring water

Recommended yeast
Lalvin EC-1118 or RC212

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Bottle still and off-dry. May require no sweetening. However, some folks prefer this recipe sweetened up a lot!

Instructions
- Bring hibiscus to a boil in five cups of water, kill the flame, and steep 30 minutes.
- Stir raw honey and thawed fruit together with six cups of cold water in your brew bucket.
- Drain and discard hibiscus petals, add hibiscus tea to the must, stir to combine.
- Top up to just over one gallon with remaining spring water.
- Add pectic enzyme, following the package instructions.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Make sure to punch the cap every 24-48 hours.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Rack to secondary and allow to clear.
- Stabilize and back sweeten to your taste preference using a neutral honey.

Why this recipe works: Hibiscus and tart cherry is such a perfect combination. Back that up with pretty much any neutral honey, and you've got something truly wonderful to act as an introductory mead for friends and family to enjoy.

What we like about it: It's so simple and inexpensive - yet you will pull off an incredible end product that is delicious early, but fantastic after a year or more of aging.

Potential changes or additions: A little bit of oak can do well in this brew. Or, try dry-hopping this with 15 grams of hops (in a bag) a week before bottling.

Pick something fruity and bold – like Azacca or Zythos. Go wild. Treat yourself.

Important note:

A red wine yeast will do well here to extract color, flavor, and tannin from your fruit. Lalvin's RC212 is a wonderfully reliable choice for this recipe.

Juniper Metheglin

Target Original Gravity: 1.062
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 8%

Serve sparkling and chilled.

Relax into the crisp simplicity of a session mead infused with the invigorating duo of juniper and hops. At a modest alcohol content, it's designed for easygoing enjoyment. The juniper imparts a subtle botanical brightness, while the hops contribute a delicate, floral and citrus complexity, creating a well-balanced medley of flavors. With its approachable recipe and a touch of herbal sophistication, this session mead invites you to unwind.

juniper metheglin

Primary Ingredients
- 6 grams dried juniper berries
- 5 grams Centennial hops
- 5 grams Citra hops
- 1.75# raw honey
- Spring water

Secondary Ingredients
- 4 oz Maltodextrin Powder

Recommended yeast
Lalvin EC-1118

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Bottle condition off-dry, using erythritol to taste if desired.

Instructions
- Crush juniper berries, divide into two equal portions.
- Divide hops into two equal portions.
- Place half of the juniper and hops into the sanitized fermentation vessel.
- Add honey and one quart of water, stir or shake to combine.
- Bring one half gallon of water to boil, add in the other half of the hops and juniper and boil for fifteen minutes. Strain. Allow to cool to room temperature. Add to fermentation vessel.
- Top up with spring water to one gallon.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment in a dark place under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month in a dark place.
- Rack to secondary on top of erythritol and maltodextrin, stir gently to combine. Allow to clear in a dark place.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: It's crispy, earthy, and resinous – but with a clean finish. Crushable.

What we like about it: Juniper is an ingredient that requires proper balance to pull off. The hops in this recipe, along with the dryness afforded by a honey ferment, allow the juniper to shine without outshining the other ingredients.

Potential changes or additions: You may want to try this even sweeter than prescribed. We can recommend up to 2.5 ounces of erythritol for back sweetening a one gallon batch.

Important note:

If using foraged Red Cedar berries instead of the typical juniper found in spice shops, you may want to double the amount of juniper in this recipe. If you're tasting before bottling, and believe it needs more juniper flavor, you can steep some crushed juniper berries in it for a day or two to achieve that enhanced flavor.

Tasty Mead

Target Original Gravity: 1.039
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 5%

Serve sparkling and chilled.

This recipe was initially inspired by the adventurous spirit of the video game “Valheim.” Brewed at session strength, the “Tasty Mead” is a delightful concoction of honey, blueberries, and raspberries, capturing the essence of the game's mead crafting component. Just like a refreshing potion after a day of virtual exploration, this session mead brings the flavors of Valheim to life, offering a tasty respite for both gamers and mead enthusiasts alike.

tasty mead

Primary Ingredients
- 1 lb honey
- 1 lb raspberries
- 0.5 lb pound blueberries
- Spring water

Secondary Ingredients
- 1/2 cup erythritol

Recommended yeast
Red Star Premier Rouge or Lalvin RC212

Recommended Nutrients
Frontload 2 grams of Fermaid O

Recommended finishing
Sparkling, semi-sweet. For my palate, this means ½ cup of erythritol to back sweeten this one-gallon batch.

Instructions
- Freeze and thaw fruit, gently crush.
- Combine primary ingredients. Top up with spring water to just over one gallon.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading nutrient.
- After primary completes, allow to rest one week.
- Rack off of the fruit to secondary and allow to clear.
- Back sweeten using erythritol, stirring gently to combine.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: The high fruit load and low ABV create a crisp and fruit-forward session mead.

What we like about it: This brew lives up to its name of being tasty! If you like juicy tart berries and drinks that brim with effervescence, you'll love this one too. The acid and tannin in the fruit beautifully balance this brew completely naturally, which we love.

Potential changes or additions: Try flipping the fruit quantities and you can experience what an even-more-blueberry-forward session mead tastes like. You won't regret it. Or, try adding a cup of lemon juice into the must for a lemonade-adjacent brew.

Lemongrass Metheglin

Target Original Gravity: 1.036
Estimated Final Gravity: 1.001
Approximate Alcohol by Volume: 4.5%

Serve sparkling and chilled.

Elevate your mead experience with a metheglin that seamlessly blends the zesty vibrancy of lemongrass with the citrusy allure of Citra hops. This mead offers a bold departure from the norm. The herbal notes of lemongrass dance in tandem with the bright, aromatic qualities of the hops. The result is a well-balanced and wildly refreshing fusion of flavors.

lemongrass metheglin

Primary Ingredients
- 1 lb honey
- 11 grams Citra hops
- 0.75 ounces maltodextrin
- Spring water

Secondary Ingredients
- 2 stalks lemongrass, diced up
- Half an orange worth of zest
- Half a thumb of ginger, diced

Recommended yeast
Lalvin K1-V1116

Recommended Nutrients
Frontload 2 grams of Fermaid O

Recommended finishing
Sparkling, dry

Instructions
- Pour honey into sanitized carboy.
- Add two quarts of water to a clean stockpot and bring to boil.
- Place half the hops and all the maltodextrin in the boil. You will be boiling gently for 60 minutes total.
- After 45 minutes, add the remaining half of your hops.
- At the one-hour mark, kill the heat and strain out the hops by pouring the must through a fine mesh strainer into a clean vessel.
- Chill the must quickly by adding one quart of very cold spring water (or potable ice).
- Transfer into the carboy and blend with the honey. Top up to one gallon with spring water.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading nutrient at the 24-hour mark.
- When fermentation has completed, rack into secondary on top of lemongrass, zest, and ginger.
- Rack to tertiary after one week. Allow to clear.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: You may have noticed by now that I like to add some hops to a metheglin. It's never so much as to overpower the other flavors - rather, the hops support the more delicate nuance of ingredients like lemongrass and ginger.

What we like about it: Refreshing, brisk, and crisp. This is a mead that needs no back sweetening to be wonderfully balanced.

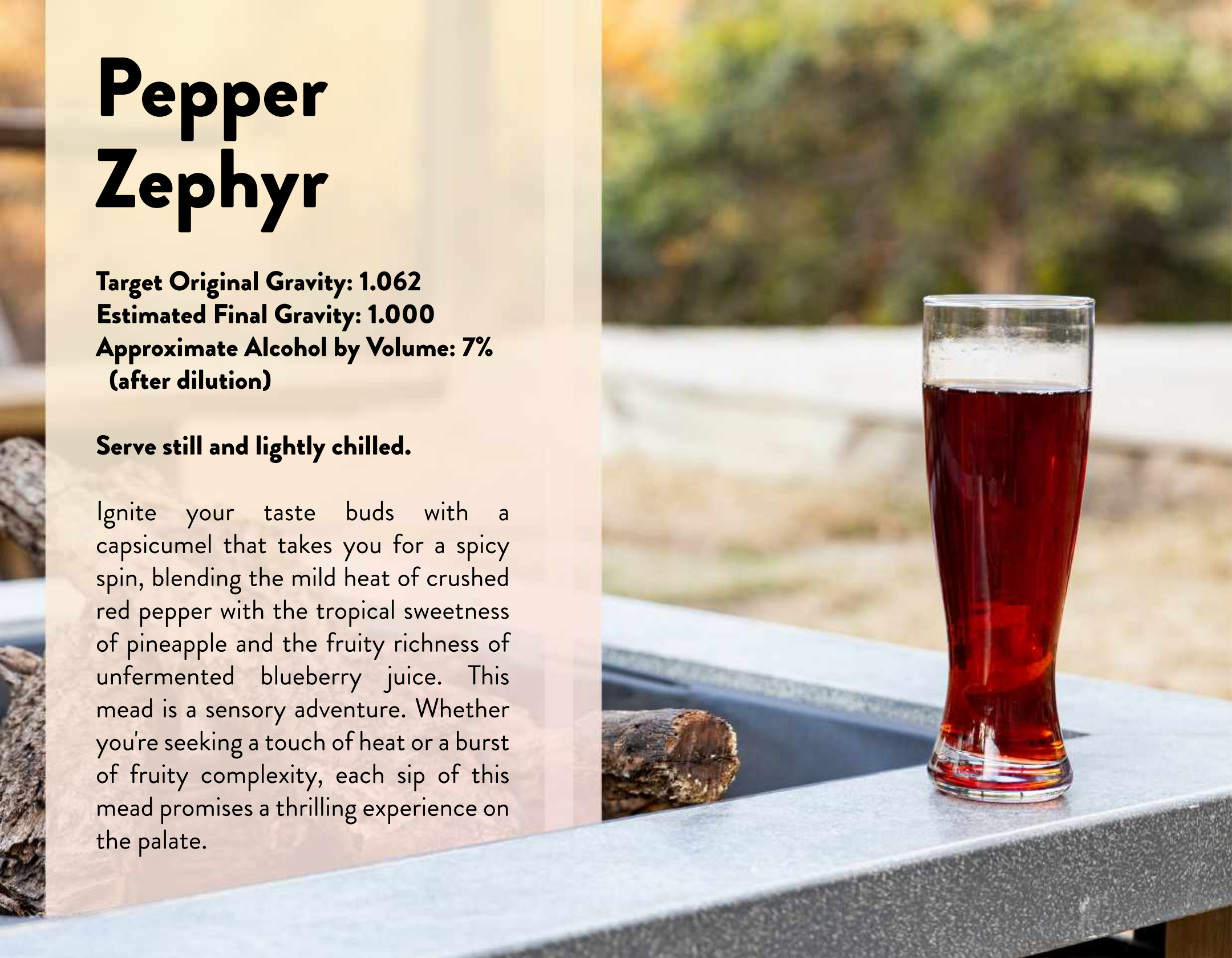
Potential changes or additions: Every herb/spice in this recipe can be increased or decreased to match your palate. Some may want more lemongrass, others may want more spiciness from the ginger. Feel free to fine-tune it to your palate preference.

Pepper Zephyr

Target Original Gravity: 1.062
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 7% (after dilution)

Serve still and lightly chilled.

Ignite your taste buds with a capsicumel that takes you for a spicy spin, blending the mild heat of crushed red pepper with the tropical sweetness of pineapple and the fruity richness of unfermented blueberry juice. This mead is a sensory adventure. Whether you're seeking a touch of heat or a burst of fruity complexity, each sip of this mead promises a thrilling experience on the palate.



pepper zephyr

Primary Ingredients
- 9 ounces pineapple juice
- 1.65 lbs fruity honey
- 2.5 grams crushed red pepper
- 1.2 grams wine tannin
- Pectic enzyme
- Spring water

Secondary Ingredients
- 13 ounces blueberry juice
- 8 ounces honey (after stabilizing)

Recommended yeast
Lalvin QA23

Recommended Nutrients
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Sweet. For my palate, this means half a pound of honey or erythritol to back sweeten this one-gallon batch.

Instructions
- Mix primary ingredients and top up with spring water to just under 1 gallon. (Note: We are leaving space here to add that 13 ounces of blueberry juice in secondary.) Stir well to combine.
- Add pectic enzyme by package instructions.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest two weeks to a month.
- Gently pour blueberry juice into secondary vessel by running it down the side of the carboy with minimal splashing.
- Rack mead to secondary on top of the blueberry juice, leaving the solids behind.
- Allow to clear.
- Stabilize and back sweeten with honey, or back sweeten using a nonfermentable sweetener.
- Bottle in 12oz or smaller bottles.

Why this recipe works: The fruity flavors offset the spice in a way that allows both sensations to tango across the tongue cohesively. The tropical flavor of the pineapple and the juiciness of the blueberry carry the capsaicin from the peppers in two separate, but comingled ways.

What we like about it: This lower-ABV mead is leggy but sippable. It can be very easy to finish a 12oz bottle by oneself.

Potential changes or additions: While it is difficult to recommend changes to a recipe that has been constructed to “just work,” there is certainly room to play with ABV and viscosity. Try adding 50% more honey in primary, then adding in 1.5oz of maltodextrin and 1.5oz of lactose in secondary to give the brew some chew and creaminess. It will transform into a much more full-bodied beverage. Then, serve as you would a cordial - with a 1oz pour, chilled.

Blueberry Melomel

Target Original Gravity: 1.113
Estimated Final Gravity: 0.998
Approximate Alcohol by Volume: 15%

Serve still and room temperature.

Prepare your body for the luxurious experience of a blueberry-forward sack mead that channels the bold character of a robust red wine. Crafted with a subtle infusion of creamy lactic acid, ample honey, and a bold punch of American oak, this mead offers a velvety richness that goes on for days on your palate. Each sip is a symphony of flavors, making this mead a sumptuous and sophisticated choice for those seeking a wine-like experience with the allure of a blueberry finish.

blueberry melomel

Primary Ingredients
- 0.75 gallons of blueberry juice
- 2 pounds fruity honey
- 3 grams 80% lactic acid solution (optional)
- Pectic enzyme by package instructions

Secondary Ingredients
- 1 ounce medium toast American oak

Recommended yeast
Red Star Premier Rouge

Recommended nutrients
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Semi-sweet. For my palate, this means 6 ounces of honey to back sweeten this one-gallon batch.

Instructions
- Mix together primary ingredients to make one gallon of must. You may need slightly more or less blueberry juice than predicted.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- After primary completes, allow to rest six to eight weeks.
- Add oak to the secondary carboy.
- Rack mead to secondary on top of the oak chips and add stablizers.
- When the oak flavor is to your liking – generally just a few days to week – rack to tertiary and back sweeten to taste.
- Bottle and enjoy. Best after one year of age.

Why this recipe works: The juiciness of the blueberries, vanillin in the oak, and the softness of the lactic acid all work together to create a mead that is Malbec-adjacent in profile, flavor, and mouthfeel. It is a decadent, luxurious experience.

What we like about it: While this brew is more costly and complex than others in this book, the end result is a mead that you will be eager to share with friends and family. At home, you can create a truly extraordinary experience from relatively simple ingredients.

Potential changes or additions: French oak could contribute a more pronounced astringency as a replacement for the prescribed American oak. Some may prefer this brew without the enhanced vanillin offered by the American oak. There is definitely room to play in the acid and tannin profiles in this melomel.

Sweetening with bottled blueberry juice, rather than honey, can enhance the fruit flavor in this mead. Though, take note, it will lower the ABV and thin out the mead.

Beginner Braggot

Target Original Gravity: 1.042
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 5.5%

Serve sparkling and chilled.

Kick back after some yardwork with this crisp braggot, where the rich essence of honey and honey malt takes center stage, unabashed. This mead boasts the natural sweetness of honey malt, which elevates the honey backbone. Embracing a balanced hops character that doesn't overpower, this braggot offers a subtle, floral complexity, enhancing the overall experience without overshadowing the honeyed richness.

beginner braggot

Ingredients
- 1 lb wildflower honey
- 1/4 lb buckwheat honey
- 3.5 ounces honey malt
- 28 grams Centennial hops
- Spring water

Recommended yeast
Kveik; Voss or Hothead, fermented above 80F
Alternatively, SafAle US-05

Recommended Nutrients
Frontload 3 grams Fermaid O

Recommended finishing
Sparkling

Instructions
- Use a bucket for primary fermentation!
- In a stock pot, steep honey malt in 0.75 gallons of spring water at 154F for an hour. This is easiest when using a brewing bag to hold your grains.
- Strain out grains and discard them.
- Bring wort to a boil, add in 9 grams of your Centennial hops. You will be boiling for a total of one hour.
- After 45 minutes of gentle boiling, add in remaining Centennial hops.
- Meanwhile, pour honey into the fermentation bucket.
- After the final 15 minutes of your boil, kill the heat.
- Carefully, and with the help of a friend, pour the warm wort through a fine mesh sieve to into the fermentation bucket, so as to remove the hops debris. Do not burn yourselves!
- Stir to combine.
- Top up to one gallon with more cold spring water if needed.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding your nutrient at the 24-hour mark.
- After primary completes, allow to rest two weeks.
- Rack to secondary and allow to clear
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: The buckwheat honey and honey malt work together to bring a wonderful, rich, earthy honey character to this braggot. This makes it feel like you're drinking a honey-forward beer.

What we like about it: So crushable. So honey forward. The perfect braggot for an afternoon of fishing!

Potential changes or additions: You almost certainly want to play around with different varietals of hops for the aroma addition (the one at 45 minutes into the boil). Something resinous like Green Bullet could bolster the "beeriness" of the brew. Alternatively, a fruity hop like Hallertau or Nelson Sauvin could be a wonderful complement to the honey aromatics.

Session Mead

Target Original Gravity: 1.044
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 6%

Serve sparkling and chilled.

This traditional session mead lets the pure essence of honey take center stage, allowing its fruity nuance to shine. Lightly sweetened to enhance the honey's character, this hydromel captures the delicate balance of sweetness and brightness, making it perfect for a hot summer day. The brilliant sparkle adds a touch of effervescence, creating a refreshing and familiar-seeming mead that invites you to savor the simplicity of honey in every delightful sip.

session mead

Ingredients
- 1.25 lbs orange blossom honey
- 0.6 grams malic acid
- 0.2 grams citric acid
- 0.6 grams wine tannin
- Spring water

Recommended yeast
Kveik; Voss orLutra
Alternatively, SafAle US-05

Recommended nutrients
Frontload 3 grams Fermaid O

Recommended finishing
Sparkling

Instructions
- Combine all primary ingredients and top up to 1 gallon with spring water
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading your nutrient at the 24-hour mark.
- After primary completes, allow to rest two weeks.
- Rack to secondary and allow to clear.
- Back sweeten, using 4 ounces of erythritol. Stir gently to combine.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: Every element works to push the honey flavor forward. It's like a crisp, honey-flavored hard seltzer.

What we like about it: This brew is crushable and complete. With relatively few ingredients, it is inexpensive to make and is always a crowd-pleaser.

Potential changes or additions: Make a hopped version! Boil 5 grams of Cascade hops for 30 minutes in a gallon of your brewing water. Strain and cool, then use along with the rest brewing water to mix up your must. When primary completes, throw in 15 grams of your favorite aroma hops. Then, rack to secondary after one week of dry-hopping.

Lemondrop Session

Target Original Gravity: 1.044
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 6%

Serve sparkling and chilled.

Infused with the citrusy burst of lemon juice and zest, this mead takes on the playful essence of a classic lemon drop candy. The honey remains at the forefront, its sweetness harmonizing with the tartness of lemon to create a bright and thirst-quenching profile. With a low ABV and a gorgeous sparkle, this mead is a lively and sessionable treat that captures the spirit of a sunny day.

the lemondrop

Primary Ingredients
- 1.25 lb orange blossom honey
- Zest and juice of ½ a lemon
- 1 gram wine tannin
- Spring water

Secondary Ingredients
- 6 ounces lemon juice
- 1 lemon's worth of zest

Recommended yeast
Lalvin K1-V1116

Recommended nutrients
Frontload 3 grams Fermaid O

Recommended finishing
Semi-sweet and sparkling. For my palate, this means 4 ounces of erythritol to back sweeten this one-gallon batch.

Instructions
- Mix primary ingredients in fermentation vessel and top up with spring water to 1 gallon.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading your nutrient at the 24-hour mark.
- After primary completes, allow to rest two weeks.
- Place secondary ingredients and back sweetening erythritol in secondary vessel.
- Rack mead to secondary, stir gently to combine. Allow to clear.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: The lemon and honey stand together, while offering parallel lines of flavor that your tastebuds can discern from one another.

What we like about it: Ever had a honey lemonade that just slaps? Here, you've got that in mead form. Refreshing!

Potential changes or additions: Get wild and sub in lime juice in replacement of all or part of the lemon juice! Or, for an "Arnold Palmer" vibe, brew this up using non-sweetened black tea as half of your brewing liquid (and skip the powdered wine tannin).

Dandelion Mead

Target Original Gravity: 1.072
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 9.5%

Serve still and lightly chilled.

Step back in time with a humble yet delightful dandelion mead, paying homage to the resourcefulness of Great Depression-era recipes. Crafted with golden dandelion petals and just a hint of citrus zest, this mead is a testament to simplicity and creativity. The dandelion imparts a subtle, floral earthiness, while the citrus zest adds a touch of brightness. With every sip, you're transported to a bygone era, savoring a mead that reflects the ingenuity of the past and the natural beauty found in simple ingredients.

dandelion mead

Primary Ingredients
- 8 ounces dandelion petals, no greens or stems
- 2 lbs fruity honey
- 1 campden tablet
- Zest and juice of half a lemon
- Zest of one quarter mandarin orange
- 1.5 grams wine tannin
- Exactly 1-gallon spring water

Recommended yeast
Lalvin K1V-1116

Recommended SNA
TOSNA - use a nutrient calculator to determine amounts

Recommended finishing
Sweet. For my palate, this means ½ pound of honey to back sweeten this one-gallon batch. You may want much more!

Instructions
- First off: brew this in a bucket! Don't try fitting all these petals in a carboy neck.
- Place all primary ingredients into fermentation vessel.
- Crush up and mix in 1 Campden tablet. Cover with an airlock and wait 24 hours.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, adding staggered nutrient additions by the prescribed schedule.
- Be certain to punch down the petal cap daily with a sanitized spoon.
- After primary completes, rack to secondary, leaving the dandelion matter behind.
- Allow to clear.
- Stabilize and back sweeten, then bottle and age for one year.

Why this recipe works: The dandelion petals are characteristically floral, which might be too much if not balanced by the citrus. This mead isn't for everyone, but it works for those who like a foraged delight.

What we like about it: Strong honey character, low-ABV sippability, and a good use of an otherwise pervasive herb.

Potential changes or additions: Consider raising the ABV with added honey in primary, and sweeten it considerably. This will make it even closer to the Depression-era drink that inspired it.

Important notes:

Make sure to pick dandelions in a field where you know there have been no pesticides used.

You can pluck the whole dandelion head and freeze them for later. Using gloved hands, carefully separate the petals from the greens. This can be done with a simple "pinching" motion, which I find works best when the heads are still frozen.

The greens are bitter and grassy, and you want none of them ending up in your mead.

Juice Box Cooler

Target Original Gravity: 1.050
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 6% (after dilution)

Serve still and chilled.

Rekindle the joy of your childhood lunchtimes with a mead that captures the very essence of a juice box. This citrus-infused delight brings back memories of sunny afternoons on the playground, but was crafted with thirsty grown-ups in mind! Formulated to evoke the simplicity of recess treats, this mead is a cheerful homage to the classic juice boxes of yesteryear, offering a sweet and sunny sip of nostalgia with every glass.

juice box cooler

Primary Ingredients
- 1.2 lbs honey
- Spring water to 0.85 gallons

Secondary Ingredients
- 1 can orange juice concentrate (12 ounces)
- Juice from 1 lb tangerines or mandarin oranges
- 3 drops green food dye

Recommended yeast
Lalvin EC-1118

Recommended nutrients
Frontload 3 grams Fermaid O

Recommended finishing
Sweet. For my palate, this means ¾ pound of honey to back sweeten this one-gallon batch.

Instructions
- Mix primary ingredients in fermentation vessel. You will be starting with less than one gallon in primary, saving room for later.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading your nutrient at the 24-hour mark.
- After primary completes, allow to rest two weeks.
- Stabilize with potassium metabisulphite (campden tablets) and potassium sorbate.
- In a large stock pot, boil orange juice concentrate and tangerine/mandarin orange juice. Kill heat and allow to cool to room temperature. Briefly boiling the juice helps lock in some of the haze.
- Once cooled, place orange juice mixture in the secondary vessel and rack your brew to secondary.
- Back sweeten to taste.
- Add food dye.
- Allow solids to precipitate and settle out.
- Bottle and enjoy chilled.

Why this recipe works: This recipe takes everything about those silly childhood juice boxes we all loved and elevates it just a touch. It's orange-forward, and honey rich.

What we like about it: It reminds us of a simpler time where sweet drinks were the norm. It's a fun nostalgic trip, but one glass is enough for this mead maker. Then I need to switch to something lighter!

Potential changes or additions: Consider adding the citrus juices to a non-stabilized brew in secondary. Let the whole brew finish secondary and clear, then back sweeten with a pound of erythritol and bottle condition using priming sugars. This can turn this silly childlike drink into an all-grown-up mead mimosa! Food dye optional.

Honey Tepache

Target Original Gravity: 1.040
Estimated Final Gravity: 1.000
Approximate Alcohol by Volume: 5%

Serve sparkling and lightly chilled.

This pineapple mead embraces the spontaneous charm of a slight wild ferment. Crafted with the enticing allure of tepache, this mead boasts a lively fusion of pineapple and natural funk. The wild ferment adds a layer of complexity, creating an intriguing interplay of flavors that evolve with each sip. This mead captures the essence of tepache's unconventional character, but offers a wonderfully spirited honey-forward twist.

honey tepache

Ingredients
- 1 chopped up pineapple with the peels
- 0.5 lb piloncillo crushed
- 0.5 lb rich honey
- Exactly 1 gallon spring water

Recommended yeast
Cotes de Blanc or Lalvin QA23

Recommended nutrients
2 grams Fermaid O, frontloaded

Recommended finishing
Sweet and sparkling. For my palate, this means 12 ounces of erythritol to back sweeten this one-gallon batch.

Instructions
- Rinse pineapples thoroughly under cold water before slicing.
- Combine primary ingredients in a brewing bucket, cover with an airlock.
- Wait 48 hours.
- Rehydrate yeast using a rehydration nutrient, if desired. Pitch in yeast.
- Ferment under airlock, frontloading nutrient at 24 hours after yeast pitch.
- After primary completes, allow to rest one week.
- Rack off of the fruit to secondary and allow to clear.
- Backsweeten, using 12 ounces of erythritol. Stir gently to combine.
- At bottling, add 1 tsp of granulated sugar to each 12oz bottle. Bottle with crown caps or in swing-top bottles.
- Wait 4-6 weeks to carbonate in the bottles, serve chilled.

Why this recipe works: The microbes on the pineapples give the brew a slight natural funk, which occurs during the first 48 hours of natural fermentation. After this, the wine yeast takes over and finishes the job in a relatively clean ferment. So you get a boozy tepache mead, but without *only* relying on the pineapple's microbiome to get there.

What we like about it: The pineapple flavor really sings here. But with proper back sweetening, the honey flavor cuts through as well with a rich, floral background note. A rich honey like meadowfoam, coffee blossom, or alfalfa works well here.

Potential changes or additions: If you're a pepperhead like me, you might want to try tossing a dried hot pepper into secondary to add some spice. Once the heat is where you want it, simply rack to a tertiary container and continue aging and clarifying. In some parts of the world, tepache is spiced with warm spices like cinnamon or clove. If that is a flavor profile you're after, be sure to add the spices in secondary and check the taste every few days so you can rack off when the flavor is right.

Important note:

Can't find piloncillo? Substitute in some dark brown sugar instead.

GLOSSARY

There are a lot of words and phrases used to describe alcoholic beverages. A couple years ago, I set out to catalog and define as many of those words as I could. That resulted in a card deck called Sip & Sayvor. Each of those terms is now included in this glossary to help you describe your visual, aromatic, and flavor sensations.

What follows is a relatively comprehrensive list of terms used to describe fermented alcoholic beverages. Most of the included terms are applicable to meads, though some are more appropriate to describe ciders, wines, and beers.

Accessible: Not so complex as to overwhelm the palate, but still a flavor experience that inspires even the inexperienced palate. Not too oaky, not too tannic or tart, but balanced and approachable.

Acidic: Tart, puckering, and perhaps in some ways biting. Acidity can have a full range of flavors and perceived textural and aromatic experiences. But you can easily identify it when it is present.

Acrid: Having an irritatingly strong and unpleasant taste or smell. Could be associated with highly roasted malts - kind of a burnt character. Can also mean your brew is infected or something has gone wrong.

Alcoholic: Boozy, perhaps medicinal or hot. But the alcohol has become the foremost flavor in the brew. These aren't spirits! Age this brew and hope it breaks down over time.

Angular: The opposite of a sensation of roundness, this brew shifts suddenly. Maybe it's a tight edge from acid to sweetness, or maybe it's a strong sensation of structure that turns sharply instead of flowing. But it sits in the palate like a pyramid - which, generally, is experienced as being unpleasant. Imagine you're in a bumper car as various flavor compounds smack you one by one, but never all at once. Chaotic.

Astringent: The brew wicks moisture from the palate. This sensation is typically experienced in the sides of the mouth, near the back of the jaw. Place a black tea bag on your tongue for a few moments and you will experience astringency in its purest form!

Balanced: The acid doesn't stick out. It's not too sweet. And while it has good body and tannic value, it's not overly astringent or bitter. In beers, the maltiness and bittering perform in harmony. Everything works - no leg on the "balance stool" is too long or too short.

Banana: While banana flavor can come from fruits like banana or durian, this attribute is often introduced by certain yeasts fermented at higher temperatures. Depending on the brew, banana elements could be a fault or a benefit.

Barnyard: Straw, hay, dry grass, musk, and a hint of wet horse. This flavor profile can be difficult to pull off. Hearty honeys like buckwheat or alternative sugars like sorghum or molasses can contribute a barnyard note to a brew. It can also come from wild yeast or Brettanomyces yeast, as found in some sour beer styles. Proceed with caution!

Big: This brew is in-your-face and oversized. Think of barleywines, ports, and fruit bomb melomels. It's unmistakable and remarkable.

Biscuity: Depending on your region, this may have slight nuance in its meaning. But take it to mean baked goods - grain-rich breads, sugar cookies, or even toast. Certain malts and grains are exceptional for adding a biscuit note to a beer or braggot. It's there in one part to remind you what you're drinking - and yet in another, it's there to support the other, more prominent flavors in the glass.

Bitter: Typically a hallmark of tannic brews, either from exposure to skins and stems, or even from over-roasted grains. Bitterness is also often observed in alpha acid-heavy IPAs and dry meads. It is not always an off-flavor, but it can be considered a fault if not balanced out by elements like sweetness or acidity.

Body: Body is the sensation of palate fullness - the viscosity and feel of the brew in your mouth. It is a characteristic reflective of the drink’s final density and refers to the mouth-filling properties and overall thickness.

Brackish: There is a saltiness or umami on the palate, perhaps unexpectedly. Maybe the brewing water wasn't properly amended, or maybe the grape vines pulled something atypical from the soil. Or, in the case of an oyster stout, perhaps the brackishness was intentional as an oppositional force against a bold, malty sweetness.

Bready: Similar to "yeasty," while still its own descriptor. Breadiness in a brew can come from a variety of sources, but it is a combination of the sense of yeast, warmth, and grain. Often, it can be a marker of a younger beer or mead that still needs time to come into its own. Unless added intentionally in a grain bill, breadiness often ages out - eventually.

Bright: This brew presents with lightness, flair, and sunshine. It is typically not dark in color - no deep reds or stark browns. You want to go back for more because the levity in the brew gives you a nice shot of dopamine and cheer with every sip. This

one really pops!

Brilliant: A beverage that is crystal clear with no haze, murkiness, or sediment. Often this is achieved through extensive aging times, fining agents, or sterile filtering.

Bubblegum: What? Bubblegum? This attribute is often introduced by certain yeasts fermented at higher temperatures. If you're adventurous, bubblegum flavors in a hefeweizen style beer might be a fun departure from the norm. But it is usually seen as a fault.

Burnt: Maybe the grains were roasted too long or hot, perhaps some malt burned on the bottom of the brew kettle, or maybe some caramelized honey went too long and turned. Burnt flavors can come from a variety of sources, but they are typically seen as a fault. If, instead, what you're sensing is the smell of an extinguished match, that is another aroma entirely - hydrogen sulfide.

Buttery: Often attributed to malolactic fermentation or the presence of diacetyl, butteriness can be a blessing or a curse. In a chardonnay a smooth, soft acid profile can carry the flavor of the fruit all around the palate. In a low-hopped lager, the buttery beer can be offensive and sticky - almost an oil slick in our mouths.

Caramel: Sweet, sticky, and with some hints of butterscotch. This flavor and aromatic sings of heated sugars with plenty of delicate browning. When light, caramel flavors are a platform for other notes like malt or honey (think an American Oktoberfest brew). When heavy, caramel can add an in-your-face decadence that is supported by fruity flavors or well-balanced acid.

Cereal: A brew that evokes mental images of cereal grains - particularly those we associate with foodie flavors like oats, corn, or bran. A cereal attribute can be quite pleasant in certain styles, such as oatmeal stouts or braggots that focus on grains that aren't barley.

Chalky: A noticeable chalky note akin to fresh gravel or the feeling and flavor of the first few bites into chewing antacid tablets. Some consider it a fault, some consider it a complexity note. The easiest way to find this is in a Bordeaux white through standard contributions from that region's terroir growing Sauvignon Blanc and Semillon white grape blends... And even then, it's faint. Similar to “minerally.”

Charcoal: Difficult to describe, this chalky, somewhat charred flavor tastes like carbon. It can come from a variety of sources - and quite often no char is involved at all.

Chemical: The taste and feel of something that is noticeably artificial; for example, when a fruit flavor doesn't taste fresh, vibrant, or zesty but delivers a quick, sharp punch of a certain flavor that attacks the senses; unmistakably chemical-like. Think sugar-free candies or sodas - or the smell of disinfected lab equipment. Perhaps even odors of ammonia may be present. Your body wants to reject it.

Chewy: A brew that hangs around on the palate. Big beers or sack style meads can have a "chew" to them. It is a brew with heft - and you might feel like you need a knife and fork to get through it! Maltodextrin is often added to inflate the chew of a brew. "Chewy" is often used to dramatize descriptions of a high body brew.

Chocolate: Often referring to deep, dark flavors associated with cacao. The brew does not need to be made with chocolate in order to achieve this, though. Some malts and honeys can mimic the robust, bitter, and fruity flavors found in good chocolates.

Citrusy: Inspiring notions of oranges, grapefruits, lemons, limes, and more - citrus flavors and aromas are distinct. Zest is a great way to impart these flavors in beer or mead, but white wines can conjure up citrus sensations on their own as well.

Clean: Typically hallmarked by a lack of odor faults, off-flavors, or noticeable yeast contributions in its profile, a clean brew showcases the ingredients in their most honest and naked form. Certain yeasts have been selected for clean products under the proper fermentation conditions.

Clear: This beverage is see-through enough that you can read through it, but perhaps not on par with “brilliant.” Typically there will be very little haze suspended and next to no sediment in the bottom of the bottle, though the liquid may come in any range of colors from clear-white to deep red.

Cloudy: Often due to sediment kicked up from the bottom of a bottle - this looks just

as it sounds. The beverage has cottony puffs of particulate that move and flow within the liquid. Sometimes, a few hours in the refrigerator can settle out a cloudiness.

Clove: Clove aromatics are typically contributed by way of phenolic compounds created by yeast during fermentation. Depending on the style of brew, this could be a blessing or a curse. Of course, clove can also be added in the form of the spice itself. It can be quite nice in a cider or cyser! However, use in moderation, as clove can become overpowering if you overdo it!

Cloying: Not just sweet, but oppressively and unpleasantly so. This brew nearly sticks your mouth together. Too much. It's too damn much!

Coffee: Earthy, dark, chocolatey, bitter, rich, or robust - coffee flavor is relatively easy to identify. And whether from the grapes in wine, the grains in beer, or simply adding coffee directly to the brew, it can be a wonderful undercurrent when executed well.

Complex: There's a lot happening in here and you need several tastes to really peel back the layers. Nothing is competing, but that doesn't mean you aren't being snapped from one flavor to the next. Or maybe you're sliding through flavors one after the other. It's multifaceted, but it works.

Creamy: Smooth and coating, this is a brew that rides across the tongue carrying flavor with it. Milky or rolling like a wave, it is softened by its texture. Added lactose can contribute a creaminess to any brew, for better or worse.

Crispy: Refreshing, clean, and crushable. A drink that goes down smooth and begs for another. And another. Typically best served chilled to enhance the drinking experience. Think session meads, well-balanced IPAs, or even low-bodied sparkling white wines.

Crushable: A brew structured as such that you reach for the next one without question. You could drink an entire pint in one tip of the glass. It's usually lower bodied, lower ABV, and refreshing. Crushable is ALWAYS a compliment.

Deep: This brew goes for miles. You can stare into it and still there is more to see. For a wine or mead it may be dark, fruity, indulgent, and mystifying. For a beer it may be an intensity of richness, maltiness, and complexity that goes and goes. This can be difficult to pull off with proper structure and balance. But when you nail it, it blows you away.

Dense: Like a neutron star, there is a lot going on in this brew. But not only that: everything is very cohesive and tight. It's woven well, and packed neatly. Focused, intense. With a heavy sip, you're staring into an abyss of flavors and aromatics. Deep.

Dessert: A word to describe a multitude of senses, most often associated with high sweetness, rich delivery, chew, big, and bold. But often times, the combination of all the elements that makes a batch "dessert-like" leaves the drinker experiencing the opposite of crushable. It's a sipper. Grab a slice of cheesecake and savor the two together.

Dry: Usually reserved for describing wine, cider, or mead - a dry brew has no residual sugars after fermentation. Typically there is no sweetness remaining, as all fermentable sugars have been converted into alcohols. An over-attenuated beer can also be described as dry.

Dull: The aromas, flavors, appearance, and potentially even style are hazy and unclear. For wine, cider, and mead, this might mean a brew with low acidity. Acidity is often an essential characteristic which contributes to a brew’s flavor and freshness. In beers, this might mead a lack of definition of either the malt or hops - nothing stands out. No crispness.

Earthy: Minerals, soil, wet grass, hints of grit, or the smell after the rain. Maybe it has notes of mushrooms or damp moss on wet rocks. It may have the sensation of walking through the forest after a light rain.

Effervescent: Small cascading bubbles of fizzy carbonation carry aromatics into your nose. It sparkles across the tongue. The flavors dance with vibrant life.

Estery: Fruity flavors or sometimes floral pollen-like aromatics. Esters are yeast contributions and are easiest identified in traditional meads or run-of-the-mill wines. Depending on the style, estery notes can be a blessing or a curse.

Expressive: A brew with character, charm, or a message for the drinker. It has a story to tell and might just stair-step you

through a journey of flavors. Or maybe it has one, prominent, bold flavor it impresses upon you. But it ain't subtle.

Finish - Long: A long finish is when the flavors, aromas, and entire experience hang around for a bit - sometimes unlocking new layers you missed at the front of the tongue. Often there will be additional new experiences on the exhale, or new notes that you don't pick up until after you swallow.

Finish - Short: The tasting experience does not last long inside the mouth. A short finish would be taking a sip - and the flavor, aroma, and mouthfeel experience are over almost as soon as you swallow. Not necessarily abrupt, but there isn't much left to linger on either.

Flabby: This brew is unbalanced in a way that hangs on the palate. For beers, this is often described as the mouthfeel being too chewy or full for the style and flavor profile. In wine, cider, and mead, this can describe a range of textural issues - which often come down to the brews's mouthfeel being too uneventful. Often, this can be attributed to poor acid and tannin balance.

Flat: With respect to sparkling brews, flat refers to when the brew has lost its effervescence or bubbles. In other brews, the term is used interchangeably with "flabby" to denote that it is lacking acidity - particularly on the finish.

Fleshy: Fleshy refers to the way a brew feels in the mouth. It is a textural sensation of being chewy, meaty or beefy. When a wine is fleshy, it is heavy on the tongue and fills the mouth with flavor. The wine feels thick, but not syrupy, as if it has a lot of substance.

Floral: Exudes perfumey notes and airy sweetness on the nose that may remind us of honey. Meads are supremely capable of expressing florals both on the nose and the palate. It can range from a smack of rosebuds to a full-on flower shop bouquet. Many hops varietals will contribute a floral note to beers.

Forest: A noticeable combination of earthy, vegetal, and grassy that reminds you of a walk through a freshly rained-on forest; not always a fault.

Fragrant: The nose on this brew speaks up. What rides atop the glass confidently communicates what is in store for the tastebuds. There is an aroma that is clear and defined, which is often echoed in the drinker's exhale.

Fruity: Big fruit flavors, typically in the berry or pome family of fruits. Grape wines can be fruity as well, dependent on residual sweetness, grape selection, and fermentation conditions. Fruitiness is often complemented by some sweetness.

Full Bodied: Used to describe wines or meads above 13.5% ABV. There is more complexity than lesser-bodied brews, as well as more legs, heft, and sometimes chew in the texture and mouthfeel. A full-bodied beer is one described as having weight and density on the palate - think stouts or Belgian strong ales.

Funky: Not always a bad thing - in fact, in a tepache or cider brew it can be quite lovely. Funkiness is that not-quite-musty, not-quite-spoiled character that is more of a flashing neon sign that says "I WAS FERMENTED!" It's certainly a flavor and aromatic that you know as soon as you experience it.

Grassy: Verdant and green, but like chlorophyll - a flavor usually imparted by hops, both through heavy bittering and via certain hops varietals. Dependent on style, it could be a good thing or a bad thing. Typically, when someone describes grassiness as feeling like having "just mowed the lawn," you know it has been overdone.

Green: Verdant, sometimes vegetal. More than anything, it is fresh, young, and often bright. Not to be mistaken for "too early." Vinho Verde, a Portuguese wine, is a good example - and green is even in the name!

Grippy: A structured brew that hangs around to let you experience it. Sometimes it literally feels as though it is pulling at your palate to hold on just a little bit longer. Often, this is an asset in a good brew - it doesn't want to give you up or let you down.

Harmonious: A brew where everything works. It's well balanced, no flavor masks another, and everything just sings. A truly remarkable product.

Hazy: A murkiness so fine it cannot be identified as particulate. Haze typically comes from proteins or pectins suspended in the drink, and, occasionally, only forms when the beverage has been chilled.

Head: The rim of carbonation foam often seen on the top of a beer. Head retention

can come from a variety of factors, including the grain bill and hops used. Thick, chewy beers will often leave a stratification of head in lines around the glass after every drink.

Heady: Boozy, but not necessarily hot. When you sip this brew your head starts to swim almost immediately. Popularized in the song Lilac Wine, where it is described as "sweet and heady, like my love."

Hefty: A brawny, muscular, full-bodied brew with plenty of weight and flavor - although not always the most elegant or refined sort of brew. Typically used to describe brews in the full-bodied range with higher tannin content, a hefty or "hearty" brew is occasionally characterized by a "rustic" charm. Maybe it's a little rough around the edges. Or unbalanced in all the right ways. Or perhaps it is better for making a stew than for drinking!

Herbal: A term that can be used to describe a number of flavors in a brew, be they fresh or dried in taste. Think sage, basil, cardamom, thyme, or even dandelion. Beers made in the gruit style can have herbal undertones on the nose and in the flavor profile.

Hoppy: The brew tastes like hops - which should encompass some (or many) of the attributes of this wonderful little beer ingredient. Notes may include: florals, bittering, grassiness, citrus, stone fruit, funkiness, grape, herbs, tropical notes, pine and more.

Horse Blanket: Notes of wet horse, barnyard, wet straw, soil, or musk - can be unpleasant or even foul. Slight notes can be of interest, but it has to be done right.

Hot: The alcohol is pronounced, noticeable. Often this presents first on the nose - where it stings or burns the nostrils. Heat is usually considered a fault of fusel alcohol production, but often ages out as the fusels break down.

Intense: Bold, in-your-face, and enjoyable. This is a brew that gives you a little jolt of dopamine with every sip. You experience it strongly, with flavors and aromatics grabbing you by the collar. You may even need to cleanse your palate here and there just so you can fully experience the intensity all over again.

Jammy: Does your tongue stick to the roof of your mouth a bit? Does the brew feel a little viscous with fruity flavors hanging about? You have jamminess! In full-bodied country fruit wines this can be a real asset.

Juicy: There are notes of fresh fruit juice - apple, orange, or even agua fresca blends. The alcohol flavor and bite are nearly nonexistent, and the brew instead bursts forth with sweet, fresh flavors. Think fruited hydromels, sweet ciders, and IPAs hopped with fruity hops varietals.

Juniper: Not quite pine, not quite resin, this aromatic and flavor element comes through with a coniferous note that cools - similar to mint. Think gin. It's evergreen - Christmasy. A cool to combat any warmth in the brew.

Lasting: This brew has staying power. Sometimes this character comes from malt in beer, legginess in wines, or soft tannin in wines and meads. The flavors stick around for a while after you swallow and exhale.

Layered: There is a stratification here - the brew has defined levels of flavor on the palate. Some call this the "stair step" effect. If by accident, this can feel disjointed (see "angular"). If on purpose, and well executed, the brew takes us on a journey of discovery from sip to savor to swallow to exhale.

Leather: Relatively uncommon in the world of homebrewing, this flavor and textural sensation is thought to come from certain tannin profiles. Both the mouthfeel and taste can be impacted. This note occurs sometimes in oaked, full-bodied red wines. Leather can also sometimes be a characteristic of brettanomyces in a beer.

Leggy: Particularly used to describe wines, legginess is most evident on the sides of your glass. You may see thin ribbons of wine that linger on the glass, slowly falling back into the drink. It's a hallmark of viscosity from residual sugars or increased surface tension due to higher alcohol content and evaporation. Wine legs are a result of the Gibbs-Marangoni Effect.

Light: Airy, delicate. Often coincides with being refreshing and easy-sipping. Not to be confused with watery, flabby, or even light bodied.

Light Bodied: Typically reserved for describing meads and wines at or below 12.5% ABV, this describes a thinner mouthfeel and lower viscosity.

Luscious: This brew speaks to you. It's juicy, indulgent, smooth, and rich. You sort of snuggle down into it and get surrounded by it. It's a treat - so, treat yourself!

Malty: Desirable in many beer styles and braggots, maltiness is a combination of both flavor and mouthfeel inherent to malted grains - barley in particular. Malty flavor is round, rich, and full. It is a base of support for other adjunct flavors. Maltiness can dominate the flavor profiles of specific brews; offering a degree of sweetness and deep notes of nuts, toffee, caramel, toast, and fruit. These brews range from from light to full bodied and low to high ABV.

Mature: Often we talk of brews having a “peak” period. The aging process moves the brew in an upward trajectory toward that peak. And at the highest point, that is where the brew is mature. Everything that could go right has gone right and it is at its best. The brew often plateaus here, then begins a decline. This is not always true for some, less common styles - like some ports or sherry.

Medicinal: Often brought about by cherries and a higher ABV, this flavor note is reminiscent of cough syrup. Some might even describe eucalyptus honey as having a medicinal note. Country fruit wines may carry medicinal or cough drop flavors for many months, which can take a year or more to age out and mellow.

Medium Bodied: A brew that falls between light and full bodied, typically with an alcohol content around 12.5% to 13.5%. It can follow a variety of styles, flavor profiles, and viscosities.

Metallic: Have you ever chewed on aluminum foil or licked a cold silver spoon? Metallic flavors cool the palate and disrupt flavor sensations. This fault is one that is difficult to get past.

Minerally: This character usually comes from the water or fruit juice the drink was brewed with. Soil and water chemistry can greatly affect the final product. You know what they say, only brew with water you'd drink! It's a little earthy, maybe the slightest touch of brine, but mostly you can taste the mineral structure - like magnesium and calcium. It's a difficult sensation to describe, but we all know what it feels like!

Minty: Wintergreen, spearmint, peppermint, mugwort, or even parsley flavors and aromas are present in the brew. Usually, mint character is added via an adjunct or herb. It's cooling and can be refreshing. Overdone, it can be soapy, mouthwashy, and offensive. But a mint and lemon combination in a fermented lemonade can be out-of-this-world.

Mouth-Coating: The brew works its way all around the palate, coating the tongue, enveloping your cheeks and gums. It hangs around a bit. Often experienced in cream ales or lactose-heavy brews, like a milkshake IPA.

Muddy: The direction isn't clear. Flavors are buried or masked by other flavors. Experiencing this brew for what it truly is would be like trying to navigate through a thick fog.

Multi-Dimensional: Sometimes referred to as a stair step effect. This brew walks you through a series of layers.

Murky: A haze that can range anywhere from transluscent to opaque. When shining a light through the bottle or glass, the light is diffused rather than piercing through the liquid.

Musty: Like an old family cabin sealed away at the lake for years. It's full of retro Nat Geo magazines from the 1960s, faded furniture beneath yellowed dust covers, and some moisture has worked its way down through the ceiling tiles. None of this is pleasant. The brew is stale, off-putting to the nose, and dank.

Oaky: Oak can present a tannic value, but depending on the region of origin, can also contribute smoothing vanillins. Over-oaking can bring about a woodiness - or even char depending on how the wood was treated.

Off-dry: A slight sweetness breaks through the dryness, but only just so. There is some residual sugar left after fermentation or it has been very lightly back sweetened.

Opaque: Light can barely pierce through one side of the bottle to the other, if at all. Often seen in styles like stouts or porters.

Oxidized: Exhibits flavors of paper, wet cardboard, or it might even mimic sherry- or port-style wines in all the wrong ways.

The brew has been spoiled by excess oxygen long after the yeast would be able to consume it.

Peppery: The spice of peppercorn without the burning heat that comes with capsaicin-laced peppers. Think fresh cracked black pepper, not habaneros. This often applies to wines made from specific types of grapes, like Pinot Noir. You may also find peppery notes in the phenols produced by some Belgian style yeast strains like Saison.

Personality-Filled: The brew's got character - like that funny friend who you wouldn't take out with the family, but is the first you call when you're heading out on the town.

Pétillant: The beverage is slightly sparkling with carbonation - enough to add some visual pizzazz to the glass.

Phenolic: These flavors, often from stressed-out yeasts, can present with a spice like cloves or with an off-flavor not unlike fresh plastic or cheap adhesive bandages. This is usually a bad thing, but in small doses some clove or peppery phenols are hallmark characteristics of many Belgian style beers.

Piney: Different from resinous, this flavor and aromatic is all evergreen. Imagine the smell if you buried your face in pine needles. Imagine chewing on pine needles. Pine is incredibly distinct and shouldn't be blindly lumped in with juniper and resin!

Plump: Have you ever bitten into fruit so fresh and bursting with juicy, sugary delight that it bulges and pops with a punch? A similar sensation would be used to describe a plump brew. This brew is ripe and exploding with flavor - and is typically well balanced in both its acid and sugar profiles.

Plush: Luxurious, comforting, and warm. This brew envelopes you. Enjoy it, because you deserve it.

Puckering: Too sour. Or nearly too sour. When not offset by sweetness or maltiness, acidity on “overdrive” can literally pucker your face. Some might confuse puckering with “wicking,” which is, instead, associated with bitterness and astringency from tannic value. Sometimes, though rarely, puckering can be a positive attribute in a beverage - like fermented lemonades.

Pungent: The aromatics are notable, and for some, might be offensive. The flavor profile has elements that jump out - perhaps funky, musky, dank, or even stinging. Pungent is rarely used as a compliment in tasting notes. But, for a well-aged country fruit wine that incorporated tons of fruit and tannin, and a few years in the cellar, it might be an asset.

Racy: A brew that takes your breath away. It's alluring, intriguing, sexy. You want more. You're insatiable. What's that tannin? Where'd that acidity come from? Is that cacao and juicy berries? Why can't I put this glass down?

Resinous: Tree sap can be sweet, but there are also bitter notes and a vegetal character to it. This is what we're referring to with a “resinous” quality. Some hops can be a great choice for this, but there are also some brew styles which implement spruce tips, pine needles, or juniper bows in the process. Rarely the primary character, resin can be a wonderful complement to other evergreen or hops flavors.

Rich: There's a lot going on here. It's full featured and robust. It has some luxury to it and you want to take it slow. No sense in taking a single sip you don't have the presence of mind to savor.

Ripe: Notes of fresh fruit and brightness. It's an attribute commonly found in white wines, ciders, perry, and well-executed country fruit wines. Where fermentation sometimes fundamentally alters the character of the fruit, here that character isn't lost at all.

Round: Rather than washing back and down, a “round” brew feels as though it is washing along and across the palate. No jagged edges, no sharp points. Even when the acid profile is round, it's apparent - malic acid is a round acid that extends throughout a tasting, whereas citric acid is a sharp acid that jabs the tongue with brightness or freshness.

Satiny: This textural sensation is similar to silkiness, but has just a bit of grain to the mouthfeel of it. It is that bit of tannin that creeps forward to delicately interrupt the mouthfeel. Still, the brew is smooth - not rough at all.

Sediment: The bulk matter that typically collects in the bottom of the bottle. The brew either needed more time to clarify before bottling or there is yeast sediment

from conditioning (carbonating) the beverage in the bottle.

Sharp: The brew presents itself with focus. Sharpness may come from its crispness, effervescence, acidity, or another pointed flavor or aromatic. There are not many round or cascading flavors in this brew.

Silky: A textural sensation of the brew sliding over the tongue like fine silks drift over themselves. Its mouthfeel is smoother than smooth, which is artfully achieved. And while you can sense the liquid sliding around the palate, it doesn't simply wash away. The sensation has staying power, which makes it special.

Skunky: This fault is characterized by an odor or flavor of slight spoilage. Though maybe the brew hasn’t gone off, it doesn’t seem “fresh.” Most common in improperly stored beer, when UV light breaks down hops compounds in a way that tastes musty or even sulphuric. Not to be confused with "funk" in a brew - which can be a good thing. Some people enjoy a bit of skunkiness in green-bottle beers, as it is a baked-in expectation for the beer to be "true to form."

Smoky: Most often due to the use of smoked ingredients (fruit, honey, malt, or wood), some grapes can give off esters mimicking smoke. Smokiness can taste and smell like earth, peat, campfire, or toasted bread. Smokiness is a flavor that is rarely subtle.

Smooth: The textural sensation is glossy, soft, or possibly even creamy. One might think of the texture of gravel versus carpet versus fresh vinyl. Only one of these could be described as smooth.

Soft: Whether through lactic acid, lactose, vanilla, or some other method - this brew has been smoothed out in a way that can only be described as "soft." A cream soda is soft. A buttery chardonnay is soft. A malty, lactose-heavy milk stout? So soft.

Sour: This is a brew that has a prominent acid profile. It can be sour simply from acid additions or acid inherent to fruit in the brew. Other times, it is a result of the work of our bacteria friends lactobacillus and pediococcus. A soured beer usually requires a lactic acid producing microorganism. As a fault, butyric acid contributions can lead to off odors and flavors reminiscent of having acid reflux.

Sparkling: Cascades of bubbles burst forth from the bottom of the glass and create a persistent fizz at the surface of the drink.

Spiced: This brew has flavors associated with the spice cabinet. Perhaps they are warm spices like mace, cinnamon, or clove. Or maybe they're savory spices like rosemary or cardamom. Sometimes there may be no spices added at all - grape wines can have a spiced character all on their own.

Spicy: The brew has heat, but not from alcohol. Capsaicin from hot peppers is often the culprit. The alcohol helps carry this important molecule around, too!

Stale: Something has gone awry with this brew. There are no notes of brightness or freshness. The flavors are muted, with the lesser ones having somehow overtaken what should've been the stronger ones. Reflect on the aroma of spilled beer in a bar or ballpark long after the merriment has ceased. Some oxidation has likely occurred, or the brew has simply gone long past its peak.

Steely: There is a sharp acidity to this brew - in a way that makes it feel young and possibly even green. However, it is not necessarily a mark of a brew that's out of balance. In fact, some may prefer a steely wine for the unique vigor communicated by the acid profile.

Still: The drink has no carbonation.

Stinging: The heat of the alcohol burn, the carbon dioxide off-gassing, or both contribute to a burning sensation in your nose. This is a fault due to the brew being too young, too boozy, having fusel alcohols from yeast stress, bottles not properly conditioning, or a combination of these or other factors.

Stinky: It smells bad. No better way to say it.

Stout: Typically reserved for heavier beers that align with the style, some mead styles can be "stout" as well. There will be richness with coffee, cacao, molasses or sorghum - or even an herbal spice like fennel or licorice. In a stout style beer, hops should be a supporting flavor but not readily apparent.

Strength: Generally used as a way to describe perceptible alcohol by volume (ABV) - a high-strength feel would be akin to a warming sensation with a noticeable alcohol bite. A low-strength brew might mean very little perceptible alcohol

sensation.

Structured: The way this brew sets itself up, it's clear that everything is in place. The aromatics and flavors build toward a cohesive brew that stands up in the palate. It is balance, taken a step further.

Sulfur: We all know this smell. Strike and extinguish a match and compare the aromatics. Rotten eggs, anyone? In most beverages, this is likely a hydrogen sulfide fault from stressed yeast. But at low levels, a sulfur note may be acceptable or even expected in certain beer styles such as German Lagers.

Sweet: Sugary, syrupy, or maybe just a perceived sweetness due to contributions from the yeast or nonfermentable sweeteners in malt, fruit, or caramelized sugars. It isn't dry and the sweetness isn't muted. This brew is simply and identifiably "sweet."

Tannic: In smaller amounts tannin contributes mouthfeel, structure, and body. In larger amounts, it can be stringent, wicking, and bitter. Different types of tannin can produce different effects, sources being fruit skins and stems, oak, teas, and other adjuncts.

Tart: This attribute comes from a bright, sharp acid - typically tartaric or citric acid. It'll sometimes pucker you up, but done well with a nice boost from sweetness, it can be a fun flavor element in a big fruit bomb mead or wine.

Textured: Beyond the flavor profile, you can sense something you feel in this brew. Perhaps it is a drying tannin from fruit skins or stems - or maybe it's a grittier, woody tannin from heavy oaking. This brew provides a textural sensation across the palate. Depending on the brew, this could be an asset or a distraction.

Thick: Chew - to the max. Break out the cutting board and knives, because a super thick brew might feel like you need to carve it up before you enjoy it! Heavy body, tons of malt, intense backsweetening, and other attributes can craft a brew that's down with the thickness. But done well, it can be an exceptional experience - if only for a pint or glass!

Thin: There's not much going on here. It is insipid with little to no body, weak flavors, and even muted acid and tannin profiles. Just not enough was done to make this brew even really taste like a brew - or feel like a brew! Waste not, want not, though. Might as well get hydrated - bottoms up!

Toasty: A flavor that typically comes from the "maillard reaction." Not to be confused with the "mallard reaction," wherein a duck immediately chases you upon the sight of bread in your hand. This maillard flavor conjures memories of campfire marshmallows, hard crack sugar candy, or the fond left over in a pan after searing protein or sweet vegetables.

Tobacco: Sweet and spicy with notes of caramel, dried fruit, wood, and perfume. Often this can come from aging on certain types of oak - and is enhanced with some varietals of grapes.

Toffee: Butterscotchy and roasty, a brew with this attribute expresses undertones of caramel and rich overtones of warm milk sugars. At its boldest, it is luxurious and decadent.

Tropical: The brew pops with aromas and flavors reminiscent of pineapple, coconut, mango, banana, guava, passionfruit, and other similar fruits. This can be a product of using fruit in the brewing process - or even from contributions from a yeast strain selected for those esters.

Vegetal: Generally experienced as a flavor note, this can bring on a likeness to biting into a fresh sweet bell pepper. Often times achieved by the use of certain hop varieties, vegetal notes derived from hop additions usually accompany a noticeable amount of grassiness as well. As a fault, vegetal notes may present with broccoli or cabbagey flavors and odors. Vegetal brews can be hit-or-miss depending on balance and style.

Velvety: Texturally, the brew unfurls like ribbons or waves on the palate. It has what can only be described as a textured, but soft tannin profile that rests atop the tongue, vibrating between smooth and flannel.

Vibrant: The drink leaps to life. This can mean bright fruits, bold hops, or a keenly-honed acid profile. The brew is inspiring, alluring, and may change your perspective on the style.

Viscous: Thick, coating, and voluptuous. This sensation can sometimes be interpreted as downright syrupy. In beers, this attribute can present within the band of maltiness - and even in the richness of the head of foam. Glycerin, maltodextrin,

and lactose can enhance the perception of viscosity.

Woody: This note might accompany forest, with emphasis on bark-like characters or fresh-chopped or damp wood; it can be a fault or simply an interesting note, depending on style and execution.

Yeasty: Quite common in brews fresh out of primary fermentation, a yeasty flavor typically means there are still quite a few yeast in suspension. Think bready - like freshly baked hot rolls. Outside of certain beer styles, it's often considered a fault, and it's not something you want in most brews!

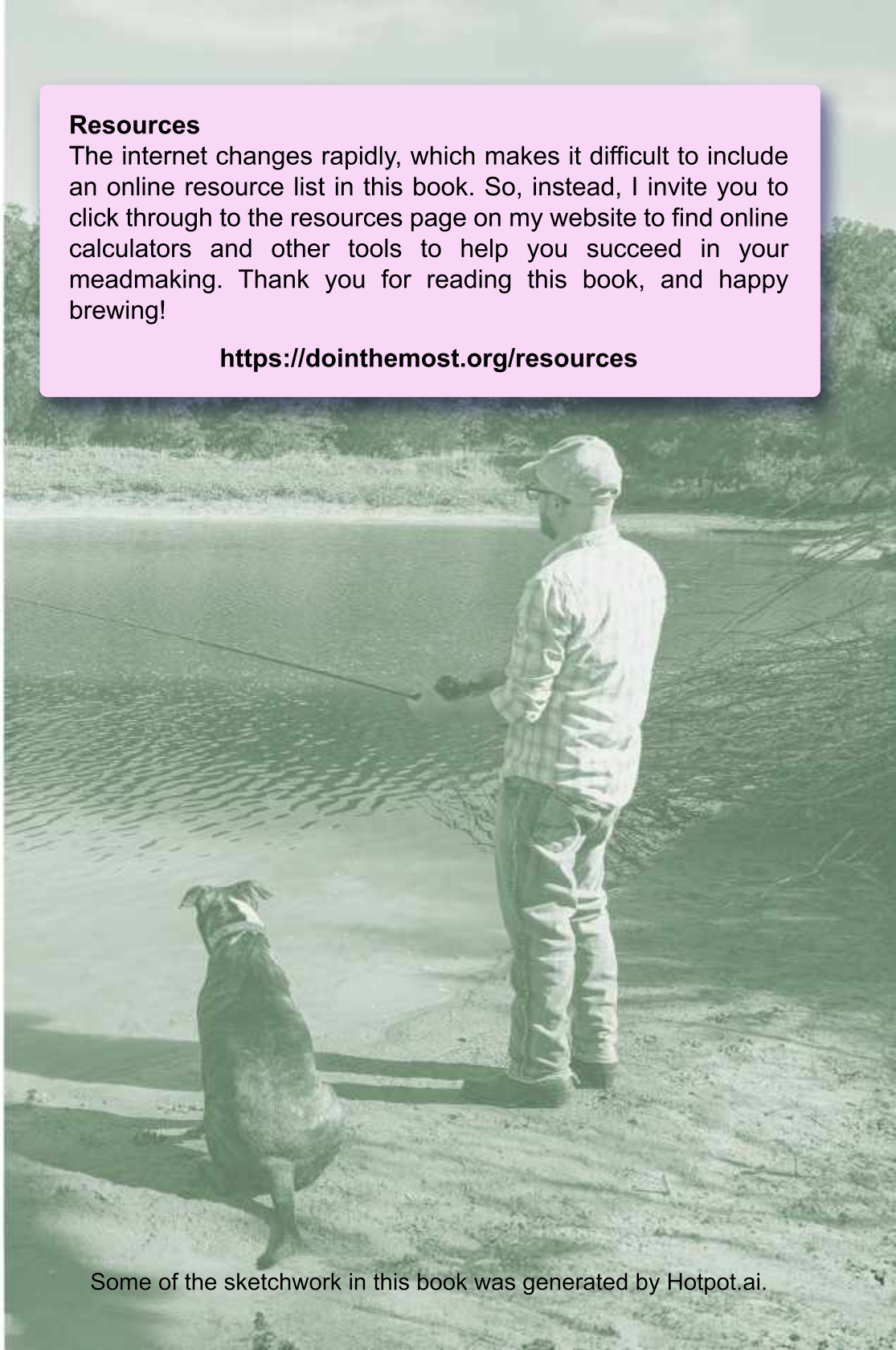
Young: A young-flavored brew is typically characterized by tasting not quite done. There may be heat on the nose and greenness on the palate. In the absence of either of these attributes, the young brew might simply taste disjointed. It hasn't had time to mellow, meld, and blossom. It's not quite ready - but that doesn't mean it won't become something spectacular with a little bit of time.

Zesty: Not just the flavors and aromatics of citrus, but specifically that of the oils of the skins on the fruit. Permeating, fresh, and alive - zestiness is characterized by a pop of flavor or aroma. Some white wines achieve this by virtue of the character of the grape or blend.

Resources

The internet changes rapidly, which makes it difficult to include an online resource list in this book. So, instead, I invite you to click through to the resources page on my website to find online calculators and other tools to help you succeed in your meadmaking. Thank you for reading this book, and happy brewing!

https://dointhemost.org/resources



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