Mead making – tips and tricks

This guide can be read from start to finish if you're a brewing novice and will provide a good starting point for your mead making adventures. If you already have some brewing experience then feel free to skip to the tips and tricks section nearer the end. Mead making has its own set of idioms and peculiarities and forewarned is forearmed.

What is mead exactly?

Mead is simply honey wine. Whereas commercial wine uses grapes as a sugar source for fermentation, mead uses honey instead.
Mead can be sweet, medium or dry, and can also be made still or sparkling.
Whichever way you make it, it's usually delicious if some common pitfalls are avoided during fermentation.

The basic process

- Dissolve honey into water to produce a *must*,
- Ferment the must using yeast,
- After fermentation, rack the fermented brew to remove dead yeast cells,
- Clear the brew of any suspended particles,
- Store or consume

All the above steps are outlined below.

Tools and equipment

Listed below are the essential items for successful mead making. Your local brewing supplies shop will have all of these in stock. I've added a cost guide for each item, current as of August 2020 from The Brew House (Newtown) online catalogue.

A large demijohn (carboy) – this is just a large bottle with a narrow neck suitable for hosting an airlock…

Figure 1: A common demijohn design

Demijohns come in various sizes and can be made of glass or food grade plastic.
Note that the larger the demijohn, the more stable the brew because changes occur more slowly, allowing time to resolve any problems as they arise.
As an absolute minimum, a 5L (five litre) demijohn can be used, but ideally a 25L volume is recommended.
Brew House prices: 23L @ $61.50, 11.5L @ $35.00. These will be food grade plastic. Glass versions are markedly more expensive. Other demijohn designs are available at varying costs.

Airlock – used to allow the escape of excess CO_2 and to prevent bacteria from getting into the must.

Figure 2: Brewer's airlock - this sits into a rubber bung that fits into the neck of the demijohn

Brew House price: $4.00.
Rubber bung with airlock hole: $5.00

Brewing hydrometer – used to read the sugar content of the must *before* fermentation, and later to assess the alcohol percentage of the fermented brew.

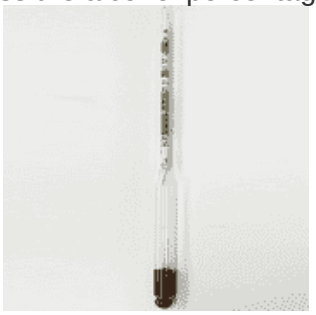

Figure 3: Brewing hydrometer

The hydrometer is an essential item. It is simple to use (explained later), and will:

- Show you the potential alcohol content of the must,

- Indicate when fermentation has completed,
- Show you the sweetness of your mead, i.e., sweet, medium or dry,
- Indicate the stage of fermentation where you can add extra embellishments such as fruit or spices.

Brew House price: BC hydrometer, 3 scale @ $12.80

Clearing agent (finings) – used after fermentation and racking to give a final polish to the clarity of your mead.

Figure 4: Isinglass beer finings

Brew House price: Mangrove Jack's Isinglass finings 1L @ $13.50.

The above equipment represents a moderate investment that can be reused for many years with the exception perhaps of the Isinglass finings which will eventually be consumed, although, since very little is used, a litre lasts a long time if kept refrigerated.

Recommended extras

These additional bits and pieces will make life easier when cleaning and racking…

- A 1.5 metre siphon tube.
- Demijohn brushes for cleaning.
- A 25L food grade plastic bucket.
- Large funnel.

Your first brew

Now that you've got everything together all you need are a few basic ingredients and you're good to go.

Ingredients

- Water
- Honey
- 1 pk of mead yeast
- 1 tablespoon of sugar

Water

Clean water is essential. It can be spring water if desired, but tap water is perfectly good so long as it's drinkable. If using tap water, fill up the demijohn and allow it to sit for fifteen minutes to ensure that any chlorine additives have dispersed before adding anything else. Spring water, despite its good reputation, can cause issues due to having very little dissolved oxygen (explained later). The Petone aquifer on Buick

Street is a great source of free, pure water, but by the time it pours from the outlet it's been sitting underground for several thousand years and has very little dissolved oxygen, so an extra step will be required to give the best results.

Honey

Since no-one can tell a bee where to forage, all honeys are different. As a result all meads are different, and you never really know what you're going to get in the end. This is either the beauty of mead making, or the frustration. It's all a matter of personal perspective. What is consistent is that no two meads will ever be the same.

Mead yeast

Use a yeast that has been selectively bred for the job such as Mangrove Jack's M05 Mead Yeast:

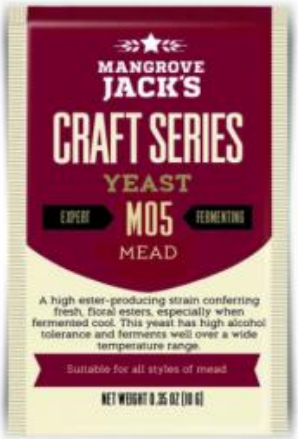

Figure 5: Mangrove Jack's M05 Mead Yeast

This yeast has a high alcohol tolerance (up to approximately 18%), is happy at room temperature and produces very few undesirable flavours. While it can struggle a little with some of the more complex sugars, it gets there in the end. You'll need 1 sachet per brew up to 25L.

Brew House price: $4.50 per sachet.

There are several wine yeasts that will also work well – ask your brewery supplies person for advice if you can't get M05 or an equivalent.

Putting it all together

The following guidelines are for a brew of approximately 25 litres but since we'll be using a brewing hydrometer to do the measuring you can make any amount you wish at the strength of your choice up to about 15% alcohol by volume.

Rules of thumb

1. A 25 litre brew requires about 8 kg of honey for a 15% strength. This ratio can be used as a starting point when considering how much honey you'll need. At its most basic, honey is simply glucose with thousands of additional flavours, vitamins, enzymes and trace minerals. The glucose is what the yeast converts into alcohol. For half the strength use half the honey and for half the volume use half the honey. This means for example, that a 10 litre brew at 10% alcohol will require about 2.2 kg of honey.

2. A kg of honey adds almost a litre of volume when dissolved. This means that a 25 litre brew containing 8kg of honey will need about 17 litres of water. Again these are approximate measures.

Getting started

Sterilise all equipment prior to use.
It's crucial not to introduce bacteria into the must because it can multiply faster than the yeast and ultimately colonise and ruin the brew. To give the yeast the best possible chance, remove as much bacteria as possible.

Before adding any ingredients:

- If you're using tap water, let it stand with an open surface for about 30 seconds per litre to allow any chlorine based additives to disperse.
- Thoroughly oxygenate the water by aggressively whisking or pouring from one vessel to another several times. This is particularly needed when using water from an aquifer or an underground spring.

Ideally using a large food grade bucket, dissolve 8kg of honey into 17 litres of water. This is probably the most arduous part of the process. Feel free to warm the water to help with dissolution but don't go much above 35 °C because there's no extra benefit and cold water holds more dissolved oxygen.

When the honey is completely dissolved gently place the brewing hydrometer into the must. The hydrometer will float in the liquid. The more sugar you have dissolved, the higher the hydrometer will float.

The scale you need to read is the PA% (potential alcohol) scale:

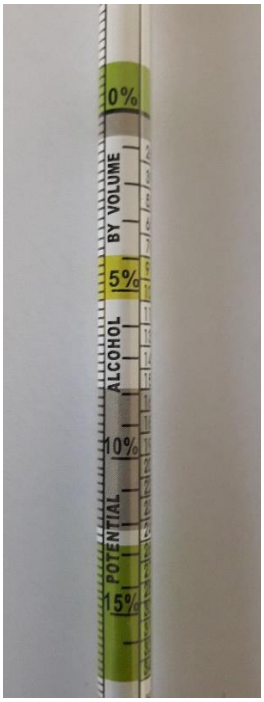

Figure 6: Hydrometer PA% scale

Read the value of this scale at the surface of the liquid. What the scale is telling you is…

If all the sugars in this liquid are fermented, the resulting brew will contain this percentage of alcohol.

So, if the hydrometer is floating very high such that the surface of the liquid is at the 15% line (near the bottom of the scale in Figure 6 above), there's enough honey in here to make a brew of 15% alcohol *if all the honey is fermented*.
If the hydrometer is sitting at say, the 12% line, you simply dissolve more honey to bring it up to your desired potential strength. If the hydrometer is sitting too high at say, 17% or more, just add more water.

Since all honeys are different you'll need to experiment a little, using the hydrometer as a guide.

When you're happy with the must, pour it into the demijohn.

Adding the yeast

Inside the sachet the yeast is dried and granulated so you'll need to give it a bit of a wake up call to motivate it:

- Add 1 level tablespoon of sugar to half a cup of lukewarm water,
- Open the sachet and tip the contents into the cup,
- Stir the powder in and then set the cup aside for 15 minutes.

When the liquid in the cup is foaming the yeast is good to go.

Pour the contents of the cup into the demijohn and put the rubber bung in the top.

Fill the body of the airlock with clean water to the *max* line and insert it into the rubber bung, then put the demijohn somewhere at a steady room temperature.

Early stage brewing

In the first 3 to 5 days the yeast spends its time devouring glucose and reproducing until it colonises the entire vessel. This stage is a partially aerobic process and the yeast makes use of the oxygen which is dissolved in the must. If no oxygen is available the yeast will become stressed and will excrete Hydrogen Sulphide resulting in a foul smelling brew. If this happens it's important to act quickly to remedy the situation because sulphide tainted mead, although not toxic as such, is not at all palatable.

Take the time to sniff the top of the airlock several times a day for the first week. If it smells sweet then all is well. If it smells like dirty nappies or rotten eggs don't linger in denial, act immediately. The remedy is described later in the Tips, tricks and old wives' tales section.

Once the colonisation is complete the fermentation process becomes fully anaerobic and you'll get a steady stream of carbon dioxide (CO_2) bubbling at the airlock. You can leave it well alone for now. A 25L brew will take several weeks to complete.

Late stage brewing

When you notice the rate of airlock bubbling slowing down, open up the demijohn and pour or syphon out a test sample.
Your hydrometer comes in a transparent plastic tube which is perfect for sampling. Fill the tube two thirds full and gently float the hydrometer in the sample.

You should see that it now floats lower in the liquid. This is because the sugars have been consumed by the yeast in exchange for alcohol. The hydrometer now floats at a level which indicates how much sugar remains unfermented.

For example, if you started with a PA% of 15% and after a few weeks of fermentation your hydrometer now sits at say 6%, this means is that your brew is at 9% alcohol content and there is enough sugar remaining for a further 6% if it's all fermented. If further fermentation is required simply return the sample to the must, reapply the airlock and wait a little longer.

How do I know when it's finished?

Simply put, fermentation is finished when you decide that it is.

Further rules of thumb:

- If you ferment until your hydrometer sits at the 2% line you'll have a *sweet* mead.
- If you continue to ferment until your hydrometer sits at the 1% line you'll have a *medium* mead.
- If you let it go all the way to 0% there will be no sugar left in the must and you'll have a very *dry* mead.

Of course sweetness is subjective, so the above is just a guide. In any case, if you close down the fermentation early, say with 3% remaining, your mead will feel thick and syrupy, which is for the most part undesirable.

Since honey is naturally acidic, and since acids taste bitter, fermenting out all the sweetness can leave a bitter tasting brew. So mead which is excessively dry can lack body and have a bitter or sour after taste with none of the wonderful flavours normally associated with honey.

Essentially you ferment until you get a brew that you like and then stop the process. So feel free to take a sip every now and then.

Ending fermentation

When you're ready to stop fermentation you'll need to do it as efficiently as possible. One effective way is to suddenly chill the brew by putting the demijohn in the fridge for 48 hours. This will cause most of the yeast to go dormant and to sink to the bottom of the demijohn.

After chilling it's important to pour off the brew into another container, leaving the majority of the yeast behind. This process is known as *racking*.

Before chilling you may want to split the brew into smaller vessels, 5L for example. You can then let some vessels continue to ferment (dry out) while racking others at the sweet or medium stage. You can also add fruit or spices immediately after the first racking to add more interest to your mead.

Racking is best done using a syphon tube so that the residue at the bottom of the demijohn is left undisturbed. The residue is then rinsed out and discarded before putting the brew back into the demijohn and reapplying the airlock.

Note that chilling and racking will not stop fermentation completely since some yeast will always remain in suspension, but it will slow it down very significantly and to the extent that the yeast can never recover and recolonise. You may need to rack at

least three times for best effect. You shouldn't have to chill the brew again after the first rack. Just leave it for a week or so in a cool place between racking.

Even a slow fermentation will produce copious amounts of CO_2, so always use an airlock. A highly pressurised glass demijohn is no joke and although it's unlikely to explode, flipping the top open is likely to result in a redecorated kitchen.

Clearing

Racking will go a long way towards clearing your mead, but because any remaining yeast particles are likely to be still alive, they will excrete CO_2 in the form of microscopic bubbles which hold the yeast particle in suspension in the liquid like tiny balloons. Correct use of a fining agent such as Isinglass will give your mead a vibrant clarity:

- Rack several times before clearing
- Before adding finings, close the demijohn and shake the brew vigorously, or alternatively pour it repeatedly between large buckets and then whisk until as much CO_2 as possible has been released. It seems a bit counterintuitive to shake up a brew that you're attempting to clear, but vigorous shaking separates the bubbles from the particles which are then flocculated by the finings and can fall to the bottom more efficiently.
- Add a measure of finings according to the manufacturer's instructions (usually 100ml of finings per 25L brew), stir well, airlock and set aside. You should see a great improvement in as little as 24 hours.
- When cleared, rack for the last time taking great care to leave all residue behind.

Bottling

All the racking and clearing can reduce your brew by up to a litre, so you'll need about 32 empty 750 ml wine bottles if you're going to bottle it all. Remember there's no rush to bottle it. It can stay in airlocked demijohns for as long as you like. If you're going to gift it, bottle it up at the time. This will allow the opportunity to taste it first and ensure its quality, because even when it's bottled your mead will continue to change with time. There is also the possibility that a stored bottle of mead will pressurise which makes opening the bottle a bit too entertaining if you're in someone else's living room.

- Sterilise bottles (and lids) before filling,
- Ideally syphon from the top half of the demijohn into the bottle,
- Close the bottle tightly,
- Label the bottle with the bottling date, the alcohol percentage and any other details that you deem relevant,
- Store in a cool place, enter the WBA mead competition, or give it to friends.

Tips, tricks and old wives' tales

Will my mead improve/taste better the longer I store it?

No. This is a myth. Stored mead can go either way.
It will certainly change and dry out over time because it's an organic mixture and even the clearest mead contains particulates that will eventually settle out. The thing is that all those particulates also contribute to the flavour of the mead, and no-one can guarantee which flavours will remain in suspension and which flavours you'll lose. By all means stash a bottle or two away but keep going back for the occasional

nip. Your mead is at its best when you decide that it is. Anyway, if mead did continuously improve then the best mead you'd ever have would be the one you never drank! What's the point in that?

Unpleasant tastes and smells

Every batch of mead is unique because every batch of honey is unique, but usually when mead smells or tastes unpleasant the issue is one of two things:

- Hydrogen Sulphide,
- Dead yeast cells, or
- Excessive dryness

Hydrogen Sulphide appears in the early stages of yeast colonisation, usually in the first week of brewing, and is due to having insufficient dissolved oxygen in the must. It is characterised by a distinct smell of rotten eggs or soiled nappies. Regular sniffs of the airlock will allow you to quickly identify the problem. If so it's important to act quickly.

All you need to do is pour the must back and forth several times between too large containers, agitating the liquid as much as possible, then return the must to the demijohn and apply the airlock. This action serves to:

- Dissipate any existing Hydrogen Sulphide that's in the must
- Dissolve as much Oxygen as possible into the must, which will relieve the stress on the yeast and return its chemistry to normal.

It's important to keep going back to sniff the airlock at least once a day and if necessary repeat the above process until all the foul smells have gone. Usually, if Hydrogen Sulphide hasn't appeared within the first week to ten days of brewing, it won't happen at all.

Dead yeast cells will blight the smell and the taste of your mead. These occur in the late stages of brewing and are a natural occurrence. You'll see a thick layer of yeast form at the bottom of the demijohn as fermentation progresses. Not all of it is dead however and even the dead cells are usually cannibalised and recycled by the living yeast. Yeast tainted mead is the result poor racking. It's important to chill the brew before the first rack so that the majority of the yeast cells are made dormant. The mead should be allowed the time to settle further before racking again, at least twice before finally clearing. There should be *virtually* no yeast left in the mead prior to bottling.

An excessively dry mead will have no sugars in it. There will be none of the marvellous flavours that we commonly associate with honey, and since honey is acidic, the result can be a bitter or sour drink with no body. As a rule you should not allow fermentation to continue until you have 0%PA. Unless you're going to throw your mead into a pot still to get your alcohol back, you should always aim to leave at least 0.5%PA in reserve.

Stalled fermentation

Honey is an elaborate mix of plant derived sugars, some of which are simple and others which are complex. Yeast will always address the low hanging fruit and will take the simplest sugars first. When the simple stuff has been consumed it's common for the fermentation process to gradually slow down as the yeast is forced to work harder. Add to this an already significant presence of alcohol, which is toxic to the yeast, and it's not uncommon for fermentation to grind to a halt.

The only answer to this issue is to be patient. The yeast will usually get there in the end, but it can take several months. There are also ways to mitigate this problem with a good brewing strategy.

Introducing a fresh yeast starter will not work. If there's already alcohol in the must and no simple sugars to get to work on, your yeast starter will be overwhelmed and killed off within minutes.

A final option is to patiently wait until you have three or four percent sugar remaining and then blend it with a dry mead resulting in a medium to sweet mead with a full flavour and no waste. Blending is always an option to rescue a disappointing mead.

A brewing strategy for beginners

Almost all of the risks associated with brewing mead can by mitigated with a good strategy. You can greatly improve your chances of a good outcome by following the guidelines below:

- *Thoroughly sterilise all equipment before use*. This is not optional.
- Make a brew of reasonable size which will be stable and yet will brew quickly. A 10L first brew is ideal.
- Use a yeast which is specifically for mead.
- Oxygenate your water beforehand either by pouring between large vessels or by vigorously whisking.
- Aim for an alcohol percentage that is well within the capability of the yeast. Mangrove Jack's M05 mead yeast has a tolerance up to 18% alcohol. You should keep well below this initially. I suggest an upper limit of 12%PA, ending fermentation at 2%PA for a sweet mead, 1%PA for a medium and 0.5%PA for a dry.
- Use a must mix of 2/3 honey and 1/3 sugar. This will introduce a large amount of simple carbohydrate to boost yeast performance without compromising the flavour of your mead.
- Regularly sniff the airlock in the early stages of fermentation and remedy any foul smells immediately. You should only smell honey.
- When fermentation is complete chill the brew for at least 24 hours.
- Always rack a minimum of three times. You can chill between racking if you have the room.
- Thoroughly whisk the brew before adding finings.
- Keep your finished mead in an airlocked demijohn and delay bottling for as long as is practical.

Above all, enjoy the adventure and share the outcome with friends.