The Newbee Guide to Making Mead – Introduction

Contributed by
Monday, 05 December 2005
Last Updated Saturday, 06 June 2009

Welcome to the Newbee Guide to Making Mead. The following chapters contain the basics of brewing Mead along with a few pointers to avoid a contaminated batch. It is written from the perspective of a complete novice to brewing and therefore contains descriptions of the equipment and the ingredients along with the method. If there are questions that are not answered here, please pop over to the forum and search the postings. You will be amazed at the depth of knowledge contained within the minds of the more experienced members found there. Wassail.

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Contributed by 3BlindMice
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The Newbee Guide to Making Mead - Chapter 1: What is Mead?

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There is no better place to start than with an explanation of what Mead is. Basically, it is nothing more than Honey, water, and yeast. This mixture (known as a Must) is allowed to ferment until the yeast has converted the sugars into alcohol, at which point it is called Mead. Since the processes, yeasts, and equipment are mostly the same as those used in wine making, Mead is sometimes called Honey Wine, but this is a misnomer since the base ingredient is honey, making it unique and therefore requiring a different name. A Pastrami sandwich is just meat between two slices of bread, but you would not call it a hamburger.

There are various ways of changing the flavor, strength, or body of a Mead to meet your individual preference. By adjusting the amount of honey or the type of yeast used, you can make the Mead sweet, semi-sweet or dry. The different varietals of honey available (see Appendix 1) will also change the flavor and aroma, as will the yeast strain.
It is possible to create different flavors by adding ingredients such as fruit or spices into the Must, or by putting them into the Mead when fermentation has stopped. The variety of ingredients you can add is as vast as the imagination itself, restricted only by common sense (we shall not discuss the Beef Jerky Mead of GotMead legend) and availability.
Don’t be dissuaded from trying something though, even if it has not been used before. Follow your own taste buds and give it a go. You may be surprised by the result.

When you start to add additional ingredients, the name changes although it is still Mead. The following are the main styles of Mead and the ingredients used to make them:

Mead Styles:

- Mead - made with honey, water and yeast
- Sack Mead - a sweeter Mead, with more honey
- Melomel - with fruit or fruit juice
- Metheglin - with spices and extracts
- Acerglyn - with maple syrup
- Morat - with mulberries
- Pyment - with both honey and grapes
- Hippocras – with honey, grapes, and spices
- Cyser - honey and apples or apple cider (apple juice in Europe) Can also be made with peach, cherry or pear cider
- Braggot - honey and malt, sort of a Mead-beer
- Oxymel - Mead mixed with wine vinegar
- Rhodomel - honey with Attar, a rose petal distillate, or rose petals
- Capsicumel - honey with chile peppers
- Omphacomel - Mead and Verjuice, the juice of unripe grapes
- T'ej –with honey, water and hops. It is the national drink of Ethiopia, and has a unique taste Once you have

decided what Mead you would like to make, you must select the honey variety and any additional ingredients you will be using

The Newbee Guide to Making Mead - Chapter 2: Honey

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Let me start here by providing one bit of advice: the better the ingredients, the better the Mead. You can make some very nice Meads using supermarket bought processed Clover honey and bread Yeast (check out Joe's Ancient Orange and Spice recipe in the Chapter 6), but the results will be average at best. Starting this way is cheap and easy, allowing you to get a taste of what could be, without putting a dent in the wallet should the batch go south. As you start t use better ingredients, you will notice that the quality of the Mead will improve and you can begin to formulate recipes that are built around the unique honey flavor itself.

Top of the list of ingredients is the Honey. After all, without this, it is not Mead. Honey comes in a huge variety of flavors depending on the flower source the nectar was gathered from. Each varietal adds its own flavor, aroma, complexity, and body to the Mead. They can be used individually, or mixed to layer the flavors and create a whole new taste. Some honeys are very light and do well in straight Meads or with very subtle and delicate fruit flavors. Others bring with them great complexity that complements stronger ingredients while not being overwhelmed by them. Taste as many honeys a you can to get an idea of what they have to offer your Mead.

Note: No Beekeeper has yet found a way to train his bees to go only to a specific type of flower, so the honey is still a mixture of different nectars from different sources. The varietal receives its name from the predominant flower near where the hive was located. See Appendix 1 for a list of the most common varietals available.

Honey has some very special characteristics that aid the Mead maker. For example, it is a super-saturated sugar solution, which means it has a very low moisture content (most honey only has between 14 & 18% water). Since most bacteria require a higher moisture content to grow, honey is naturally resistant to bacterial infection. This increases its shelf life up to 2 years (recommended by the National Honey Board, although longer storage can be achieved with proper containers and cooler environments), allowing larger quantities to be purchased and stored for future use. The ideal storage temperature for honey is between 64-75ºF. Honey also has a natural acidity, around pH 3.9, which helps t create the ideal environment for the yeast once it is dissolved in water. Research has also shown that honey, when added to an acidic solution, decreased the sourness perception up to 75%, which makes it perfect for smoothing out those overly sour Meads where the other ingredients are acidic, such as lemons, or too much acid blend was added.

There are some aspects of honey that do require some extra handling, so attention needs to be paid to the state it is in. Because of the high sugar content, honey has a habit of crystallizing and turning hard, particularly at cooler temperatures. This not only makes it harder to use, but the water sometimes separates out on top of the crystals, creating an area high enough in moisture to allow bacteria or yeast to grow. If you have some honey in this state, consider the pasteurizing methods described in Chapter 12 to ensure no unwanted spoilage organisms get into your Mead. For honey that has crystallized, heat it gently by placing the container in warm water. Do not microwave or overheat the honey as this will make it lose some of its unique floral quality.

Finally, honey comes in a number of different forms aside from the liquid or crystallized ones. For example, whipped honeys (also known as Creamed, Spun, Churned, Candied, or Fondant) have all been processed to crystallize and lighten them, making it easier to spread. These can all be used, but tend to be more expensive and harder to handle. If you'd decide to use a whipped honey, just make sure no other unwanted ingredients have been added, such as preservatives or oils.

The NewBee Guide to Making Mead - Chapter 3: Additional Ingredients

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As mentioned before, there is no set rule for what you can and cannot put into Mead to add flavor. Therefore, rather than create a list of potential ingredients, the following are some general rules for the major ingredient types that will help you avoid adding something that may spoil the flavor, be hazardous to your health, or perhaps prevent fermentation altogether. Note that the most important rule to follow is that if you like the taste of a particular fruit, vegetable, or spice, give it a try and see what happens.

Ingredient Groups -

There are 4 main types of ingredients that are most commonly used:
- Fruit
- Vegetables
- Spices, Herbs and Plants
- Other Foods

Fruit:

Fruits can be sweet, tart, tangy, bitter or mild. They can add flavor, color, acidity, bouquet, and additional fermentable sugars. They can be used whole, crushed, or juiced. The juice can even be substituted for the water, as is the case with apple juice in a Cyser. You can use fresh, frozen or canned fruit depending on availability. Whichever type you use, it important to follow the guidelines below:

· If you're using fresh fruit, peel or clean, cut up, and freeze it. Freezing breaks the cell walls, and will help release more of the fruit flavor later. This should not be done with apples or citrus.
· Make sure to scrub off any pesticides that may be present.
· In pithy fruits, such as citrus, do not use the 'white stuff' between the peel and the meat as it will lend a bitter taste to your brew. The exception is if you are looking to balance some of the sweetness with the bitter (see Joe's Ancient Orange).
· If canned, get fruit canned in water with no preservatives. These will impede or prevent fermentation.
· Likewise with bottled juices or frozen fruit juice, look out for Potassium Sorbate, a preservative that will prevent fermentation.
· If using juice, use pure juice. Added sugar in commercial juices can add strange flavors. Better to handle the sweetening yourself.
· In many cases, seeds are both a flavor detriment, and a pain when racking. If you can go seedless, do so. Some seeds are used to add some additional flavor or astringency to the Mead, such as cherry pits, but it is easier to add them later s needed than to deal with them in your fermenter.
· Invest in a decent food processor, juicer or blender to liquefy your fruit. This can also be a great way to eliminate seeds which can add off flavors to your meads.
· Watch out for sulfurs in dried fruits. You don't want them. OK to eat, not ok to use in mead.
· It goes without saying that you should pit your fruit if it has a pit.
· Consider adding more fruit into your secondary as well as your primary. Many fruit flavors are altered by the vigorous activity of first fermentation, and the addition of fruit in the secondary will bring some of the more subtle flavors back.
· Use a cheesecloth or mesh-type bag to keep your fruit in the fermenter (sparge or grain bags from a brew shop work well). Put your fruit in the bag, and close it with a sterilized zip-tie. When the fruit has given its all to the mead, it can just be lifted out, making the Mead easier to rack and wasting less of the Mead itself.
· Some fruit contain large amounts of oil, such as olives and avocados, which can cause difficulties when using (search the forum for discussions on oils in Meads).
· Get fresh fruit at your local fruit farm or farmers' market. These tend to be cheaper, and have more flavor.
· If you don't have access to fresh fruit, try the following companies for fresh-canned fruit with no additives:

Oregon Fruit Company – Makers of canned fruits and fruit bases for wines. They are expensive to ship, so check your local brewshop for them.
Vintner's Harvest - Makers of fruit bases for wines. They are expensive to ship, so check your local brewshop for them.
Bridgeberry Farms – Canadian fruit company that cans fruits and fruit juices.

Vegetables:

Many of the same rules apply to vegetables as they do to fruit.
· If fresh, make sure to scrub off any pesticides that may be present
· If canned, get vegetables canned in water with no preservatives.
· If using juice, use pure juice. Added sugar in commercial juices can add strange flavor
· Food processors or juicers work great for making fresh vegetable juice.
· As with fruit juices, avoid potassium sorbate.
· Use a mesh bag to make racking easier.
· If you need to store the vegetables, you can freeze them.

Spices, Herbs and Plants:

Spices, herbs and other plants, such as teas, have long been used in cultures the world over to add flavor or color, and sometimes to cover up other undesirable flavors. A huge selection is available in every grocery store, specialty spice shop, and over the internet, all of which are “safe” when used correctly. But remember::

JUST BECAUSE IT'S NATURAL, DOESN'T MEAN ITS SAFE!

· Always research any new herbs you're thinking of using. Many, such as wormwood, belladonna, foxglove and a number of others, are toxic. If it isn't an herb you're already familiar with, check it out before brewing with it.
· If fresh, make sure to wash off any pesticides that may be present
· Dried spices will traditionally have more concentrated amounts of the essential oils.
· Many spices will impart a good deal of their 'essence', i.e. their flavor, into alcohol. Steeping in a small amount of vodka can give you a really strong herbal brew to add to your Mead in the secondary.
· Making teas is another great way to put the spice flavor into your Meads.
· Spices can be added loose into the Must, but putting them in a cheesecloth bag makes it a lot easier to remove when the desired flavor has been reached.
· Fresh-ground is always better than pre-ground. Ground spices slowly lose their flavor as the essential oils evaporate off
· Do not use flowers from a florist. Florists use pesticides and chemicals on their florals.
· Whenever possible, use flowers that are 'heirloom' (i.e. not hybrid). Heirloom and wild flowers will tend to have higher concentrations of the essential oils that give them their smell and flavor.
· When using flowers with greenery, like dandelions, make sure to remove all the greenery as it will add a bitter flavor to your mead.
· Use a bag to facilitate removal before racking.
· Adding spices/flowers/herbs to the secondary gives you better control over the flavors. A lot will ferment out in the primary.
· Check your local health food store for fresher spices than you'll find in the grocery store.
· Be sure you check a good, modern herbal encyclopedia to make sure that what you're using is safe. Many spices used in historical recipes are now known to be harmful.
· If you can't get fresh spices, you can use powdered from the grocery store. However, if you're going to do that, then consider ordering them from a place that will give you only the highest quality. Penzey’s Spices is an excellent source of high quality whole and ground spices.

Other Foods:

This group is open to just about anything else that can be used to flavor anything. Examples of this group are Maple Syrup, chocolate, boiled candies, molasses, malt, and hops (technically an herb, but since it is used exclusively for brewing, it fits better in the other group). The same general rules listed for fruit, vegetables and spices should be followed no matter what other ingredient is chosen. Plus, the same warning applies as for the spices: make sure it is safe before throwing it into something you intend to drink!

The NewBee Guide to Making Mead - Chapter 4: Equipment

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Having the right equipment is a major component in making your brewing easier, allowing for more consistent results, and avoiding any unwanted spoilage. This does not mean that you absolutely must purchase the equipment listed below, but it is advisable to at least have the essentials. These can be purchased from your local Homebrew store (LHBS), or over the internet (check out the links to the Homebrew supplies on the GotMead main site).

The following points should be observed when selecting your equipment:
- Of key importance is to remember that everything must be sanitized. Wood, old buckets with scratches, chipped or cracked containers, all can harbor microorganisms that can be very difficult to get rid of.

- Take into consideration the ease of carrying stuff and how the size of the container will add to the weight. Note that a gallon of Must can weigh around 9 lbs, which will result in the average 5 gallon batch weighing around 50 lbs.

- Some people prefer to boil their Must, so any equipment must be able to withstand the temperature if this method is used.

- Finally, make sure that all containers used for fermenting or long-term storage (bulk aging) are made of food grade material. Glass is fine, but plastic buckets must be made of the correct material. Please read the Plastics information in Appendix 4 before selecting your container.

Primary Fermenters: A primary fermenter can be anything that will hold your liquid while it ferments without imparting any unwanted flavors or harmful chemicals. It must also be easy to clean and sanitize, large enough to hold the desired batch size, and constructed such that it can be sealed and fitted with an air-lock for closed fermentation. Glass and food-grade plastic are both excellent choices and are relatively easy to come by without spending too much money. Metal fermenters are also available, but they tend to be more expensive pieces of specialty equipment.

The cheapest and easiest container to use is a 5 gallon plastic bucket. These are available at any Homebrew store and come with a gasketed lid that seals the Must away from the outside air. There is usually a hole cut in the lid for installation of a rubber bung with an air-lock, although it is possible to get a lid without the hole. Some pails even come with spouts installed near the bottom for racking without having to siphon. Food buckets from restaurants can be used, although they sometimes have a remnant of the original content's smell that will infuse into your Mead (see Appendix 4 for tips on removing this odor). If you choose to do open style fermentation, the bucket can be covered with a garbage bag or sheet rather than with the lid and air-lock.

5 gallon glass Carboys and 1 gallon glass jugs are also very popular as fermenters. They are easy to clean, easy to seal with a bung and air-lock, and are non-reactive to any ingredient you put into the Must. They also have the added advantage of being clear so that you can watch the progress of the fermentation. Juice or wine jugs are perfect for use as a fermenter and are cheap and easy to find.

Secondary Fermenter: After the first couple of weeks of fermentation, the activity level of the must drops off and you can siphon into a secondary fermenter. The Secondary fermenter is most often a glass Carboy but can also be a 5 gallon bucket.

Siphon Hose: Used to transfer the Mead from the Primary fermenter to the Secondary fermenter (a process known as Racking), or into the bottles for storage. The hose should be clear, flexible, food-grade vinyl tubing, 5/16 in in diameter, and about 6 feet long. Siphon hose is available at any Homebrew store and some kitchen supply stores. If you are buying it from a hardware store, make sure it is food-grade vinyl.

Airlock: A simple device that allows carbon dioxide inside the fermenter to escape, without letting the contaminated air in. They come in two types, the Three Piece and the S-Bend. Either is good, although the three piece easier to clean.

Rubber Stoppers: These rubber bungs come in different sizes to fit the different neck sizes of the fermenters. They can be purchased drilled or undrilled depending on the final use. If they are for use with an airlock, make sure they are drilled when you buy them, as they are fiendishly difficult to drill yourself. Size 6.5 will fit a 3, 5 or 6.5 gallon carboy, size 5 will fit a 4 litre wine jug, and size 2 will fit the hole in the lid of 5 gallon plastic fermenter.

Long Handled Spoon: Although not a necessity if using carboys or jugs, having a long handled spoon is necessary if you are mixing your must in the 5 gallon pail or heating it on the stove in a pot. The handle must be long enough to reach the bottom of the container while still allowing you to get a good grip and avoid the hot Must. Metal or plastic is ideal not only for their ease of sanitation, but because of their strength. If buying a plastic spoon, make sure it is capable of handling temperatures above boiling.

Sanitizer: There are various types of sanitizer that can be used and will be covered in Chapter 8. Make sure you have sufficient amounts of it before starting any work on the Mead.

Bottles: There is no set rule as to what type of bottle to use to store your Mead. The three main questions that you should ask yourself before choosing the bottle type are: what type of Mead is it, how do you intend to store it, and how do you like to drink it? Each answer will lead you to a specific bottle.

a) What type of Mead is it? If it is a flat Mead, you can use any type of bottle, but if it is a sparkling Mead, then you will need to select a bottle that can withstand the pressure. Beer bottles or Champagne bottles work well.
b) How do you intend to store it? Over time, light exposure will affect the flavor of your Mead in a negative way. Therefore, if you are going to store your Mead in a lit area, you should use a green or brown bottle. If you have a dark space, then you can select a clear bottle instead. For long term storage, corked or capped bottles are best, although the Grolsch type flip-top bottles also work well. Screw top wine bottles work fine as well, but do not use screw-off beer bottles, as these require a special tool to seal the cap properly.
c) How do you like to drink it? Mead can be as strong or stronger than most commercial win type of person who likes downing
a whole bottle at a sitting, or you drink it with other people, then a wine bottle size will be best. If you prefer to drink small quantities at a time, you might want to select beer bottles instead. Of course you can also mix and match sizes for any occasion.

Corks and Caps: Corks can be purchased in two forms, Natural or Plastic. Both have merit, and both seal the bottles well. Make sure that the correct size is selected for the bottle being used (#9 is standard) and that they are sanitized before insertion.
Caps are fairly standard and can be purchased from any Homebrew store. Note that you should not try to use caps on twist-off bottles as they will not seat properly and you could end up with some nasty oxidized Mead.

Corkers and Cappers: Both Corkers and Cappers come in two forms, each designed for ease of use. The Corker comes in the table-top model and the floor model (see below). The table-top model is cheap (retails at around $22-25) and convenient to store and carry, but it can be a little difficult to work with and some models require a third hand to operate properly. The floor model works very well and requires only one person, but it is bulky and costs a little more (roughly $65-70).

The Cappers come in the Two-handled and Bench (see below) models. Both are easy to use, and not too expensive (roughly $11-14 for the Two-handled and $25-30 for the Bench). The bench model is a little quicker and allows the user to hold the bottle while capping.

If you have a Homebrew Store near you, they quite often rent any of the Corkers or Cappers for a small fee per day. Rather than spend money on equipment you may not use that often, it may be an option to just rent it when bottling your Mead.

Bottle Brushes: They come in different sizes for the different bottle and carboy sizes. They also come straight or angled to help reach the out of the way spots around the top.

Brew Pot: For heating the water, all that is needed is a pot that is large enough to hold at least half of the total liquid that will be used in the batch. It should have a heavy base and handles for easy lifting and pouring. Stainless steel is preferable, although any metal pot will work except for aluminum which will react the Must.

Thermometer: Necessary if you are boiling or pasteurizing your Must to make sure the temperature has dropped enough to pitch the yeast. Just about any thermometer will do, just make sure that you do not break it in the Must as the mercury will ruin a whole batch.

Racking cane - This is a rigid tube that fits down into the carboy. It connects to the siphon hose, and allows you to more easily siphon off the clear mead and leave the Lees (dead or dormant yeast) behind. They come with plastic caps on the bottom to keep the end of the tube out of the Lees. A Cane is not a necessity as you can siphon the Mead using just the tube, but it does make it a lot easier to avoid transferring the any unwanted sediment.

Bottle Filler or Bottling Cane: A Bottle Filler is a small tube that fits onto the end of the siphon hose to aide in filling of the bottles. It has a shut off valve at the end that starts the flow of Mead when the tube is inserted into a bottle. Two types of valves are available: spring or gravity actuated. Once the liquid reaches the lip of the bottle, the tube is lifted off the bottom and the flow of Mead stops. The Mead level will drop as the tube is removed, leaving the perfect headroom for corking or capping. Both types work well, although the spring one seems to prevent dripping better than the gravity version.

Hydrometer: A special glass float, weighted at the large end, that is used to measure the density of the Must and Mead to determine the alcohol content. The more sugar there is, the denser the liquid and the higher the hydrometer wil float. When the sugar is converted into alcohol, the density decreases and the float drops further into the liquid. They usually have three scales that measure the Specific Gravity from 0.990 to 1.170, Potential Alcohol content, and the Oechsle scale. They come in small tubes to hold the sample, although they can be floated in the open fermenter as lon as they have been properly sanitized. Make sure the one you buy is not specifically made for beer, and follow the directions provided for calibration. See Appendix 9 for instructions on how to read a hydrometer.

Wine Thief: There are times when you will need (or want) to take a sample of the Mead to test for alcohol content or to taste. To do this, you will need some sort of tube that will withdraw enough liquid to fill the Hydrometer tube (see below). A simple Turkey Baster works well for this and is easy to find. There is also a special tube called a Wine Thief that is available at any Homebrew store. This tube has a valve at the bottom that allows the tube to fill up as it is inserted into the Mead, and then closes as the tube is removed, taking with it enough of a sample to test.

Additional equipment that is nice to have, but not essential, can be found in Appendix 3.

The NewBee Guide to Making Mead - Chapter 5: Terminology and Calculations

Contributed by Angus
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Before you start into the actual recipes themselves, it is best to have a quick lesson in the basic brewing terminology and calculations that you will use.

Specific Gravity (S.G.): (Also known as Original Gravity & OG) This is used to determine how much sugar is present in the Must/Mead. The higher the SG, the more sugar is present. As the yeast eat the sugar and produce alcohol, the SG drops. This is also measured in Baumé and Brix (see Appendix 6 for the relationship between the three).

Final Gravity (F.G.): The measurement of the specific gravity when all fermentation has ceased. he lowest that can be reached is 0.990.

Alcohol by Volume (ABV): The amount of alcohol in your Mead, given as a percentage of the total volume. Most wines are around the 11% to 12% ABV, but it is possible to ferment up to 20% to 22%.

Calculating the %ABV: A very basic formula for calculating the ABV from the SG and FG measurements is:

% ABV = 133 * (SG - FG)

Example: SG = 1.1
FG = 1.010
%ABV = 12%

An easier way is to use the chart in Appendix 6. Find the potential ABV (p-ABV) for your SG and your FG, subtract t smaller from the larger, and the resultant is the final %ABV.

Example: p-ABV for SG of 1.10= 13.2%
p-ABV for FG of 1.010 = 1.3%
%ABV = 13.2% - 1.3% = 11.9%

pH or Acidity: The amount of acid in your Must will determine the health of the yeast. A solution of honey in wat will usually have a natural pH of around 3.7 to 4.6. The optimal pH for yeast is around 3.7 for best results.

Acid Blend: This is a blend of various natural acids, usually in crystalline form, that can be used to lower the pH in your Mead. Acid is an important part of balancing the sweetness of a Mead, so it should only be added once fermentation has ceased if it is determined the Mead is too sweet. It can also be added if fermentation is slow due to a pH above 4.6, but use sparingly.

Sugar Break: A term used to describe the point where a specific amount of the fermentables have been used up. There are two important ones to note: the 1/3 sugar break (1/3 of the fermentables have been fermented to alcohol), and the 2/3 sugar break (2/3 of the fermentables have been fermented to alcohol). These two points are usually when additional nutrients are added, if needed. Example: if the starting gravity of your Must is 1.120 (28 Brix), the 1/3 sugar break will be when the gravity reaches 1.080 (19.2 Brix). It is at these points that nutrient additions such as Fermaid K, yeast energizer etc. are usually added. Recommended dosage is 1 teaspoon (5 grams) at each sugar break.

Lag Phase/Exponential Growth Phase/Fermentation Phase: These are terms used to describe the life-cycle of the yeast and will be explained in Chapter 10.

Krausen: The foamy head that appears during the early stages of fermentation. It usually disappears after a couple of days.

The NewBee Guide to Making Mead - Chapter 6: The Basic Recipe

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The simplest Mead to make, often called a Show Mead, contains nothing more than Honey, water and yeast. An example would be the following:

12 lbs Honey
Lalvin RC212 Yeast
Water to 5 gallons

This will produce a dry Mead with approximately 12% ABV. Why is it a dry Mead? The yeast has the potential to ferment up to around 14% ABV. Since there is only enough honey to produce approx. 12% ABV, the yeast will not stop eating the sugar before it is all gone. With no sugar left to sweeten the Mead, it will be dry. This kind of Mead is designed to showcase the unique flavor and aroma of the varietal of honey used.

You will notice that I used the word “simplest” above, not “easiest”. There is a reason for that. Because there are no other ingredients to add flavors into a Show Mead, any tiny “off” flavor caused by a mistake in the brewing process will be easily detectable, particularly if the honey used was very delicate. It is therefore sometimes better to start your Mead making hobby with recipes that have some additional ingredients that will help mask some of the undesirable flavors, at least until you have learned and practiced the basic brewing skills.

So what should you start with? This is the perfect time to introduce you to the easiest, quickest, most foolproof recipe you could ever ask for.

Joe’s Ancient Orange and Spice Mead

A little caveat before we continue. This recipe flies in the face of just about all standard brewing methods used to make consistent and good Meads. It was created by Joe Mattioli to make a fast and tasty drink out of ingredients found in most kitchens. It is therefore perfect for the beginner, which has resulted in it being perhaps the most popular Mead recipe available on the internet. As Joe himself says “It is so simple to make and you can make it without much equipment and with a multitude of variations. This could be a first Mead for the novice as it is almost foolproof. It is a bit unorthodox but it has never failed me or the friends I have shared it with. (snip)...it will be sweet, complex and tasty.” Follow the instructions exactly as provided and you cannot go wrong. If you want to make larger batches,
just scale up the recipe keeping all ingredients in the same proportion.

1 gallon batch
3 1/2 lbs Clover or your choice honey or blend (will finish sweet)
1 Large orange (later cut in eights or smaller, rind and all)
1 small handful of raisins (25 if you count but more or less ok)
1 stick of cinnamon
1 whole clove (or 2 if you like - these are potent critters)
optional - a pinch of nutmeg and allspice (very small)
1 teaspoon of Fleishmann’s bread yeast (now don't get holy on me--- after all this is an ancient mead and that's all we had back then)
Balance water to one gallon

Process:
Use a clean 1 gallon carboy

Dissolve honey in some warm water and put in carboy

Wash orange well to remove any pesticides and slice in eights --add orange (you can push em through opening big boy -- rinds included -- its ok for this mead -- take my word for it -- ignore the experts)

Put in raisins, clove, cinnamon stick, any optional ingredients and fill to 3 inches from the top with cold water. (need room for some foam -- you can top off with more water after the first few days frenzy)

Shake the heck out of the jug with top on, of course. This is your sophisticated aeration process.

When at room temperature in your kitchen, put in 1 teaspoon of bread yeast. (No you don't have to rehydrate it first-- the ancients didn't even have that word in their vocabulary-- just put it in and give it a gentle swirl or not) (The yeast can fight for their own territory)

Install water airlock. Put in dark place. It will start working immediately or in an hour. (Don't use grandma's bread yeast she bought years before she passed away in the 90's - wait 3 hours before you panic or call me) After major foaming stops in a few days add some water and then keep your hands off of it. (Don't shake it! Don't mess with them yeastees! Let them alone except its okay to open your cabinet to smell every once in a while.
Racking --- Don't you dare

additional feeding --- NO NO
More stirring or shaking -- Your not listening, don't touch

After 2 months and maybe a few days it will slow down to a stop and clear all by itself. (How about that, you are not so important after all) Then you can put a hose in with a small cloth filter on the end into the clear part and siphon off the golden nectar. If you wait long enough even the oranges will sink to the bottom but I never waited that long. If it is clear it is ready. You don't need a cold basement. It does better in a kitchen in the dark. (Like in a cabinet), likes a little heat (70-80). If it didn't work out... you screwed up and didn't read my instructions (or used grandma's bread yeast she bought years before she passed away) . If it didn't work out then take up another hobby. Mead is not for you. It is too complicated.
If you were successful, which I am 99% certain you will be, then enjoy your mead. When you get ready to make different mead you will probably have to unlearn some of these practices I have taught you, but hey--- This recipe and procedure works with these ingredients so don't knock it. It was your first mead. It was my tenth. Sometimes, even the experts can forget all they know and make good ancient mead.
And there you have it. You have made your first Mead. Now come the steps that must be followed to make a good, and eventually a great Mead.

The NewBee Guide to Making Mead - Chapter 7: Planning

Contributed by Angus
Saturday, 06 June 2009
Last Updated Sunday, 07 June 2009

The first thing to do before you start buying ingredients is to sit down and plan your Mead. This is perhaps the most important part of the whole process (aside from the need for careful sanitation – see Chapter 12) since it is here that you will list all of the ingredients needed to produce a quality Mead. Before you rush into your new hobby, take a moment to consider what it is you are looking to do. Think about what type of Mead you imagine making. If you run before you walk, you may find that you either miss the mark completely, creating something far removed from what you had hoped for, or make an undrinkable swill. The three most important questions to ask yourself are:
- What type of Mead am I going to make?
- How strong do I want the Mead to be (how high the ABV will be)?
- What type of honey am I going to use?

When you can answer these three questions, all other variables will pretty much fall into place. For example, if you are going to make a Melomel (a Mead made with fruit), you will need to decide what type of fruit, and how much you will use. If you are going to make a strong Mead with around 16% alcohol by volume (ABV), you will need to select a yeast that can tolerate that level of alcohol (see Chapter 9) and calculate how much honey you will need. So, before doing anything, try to answer these basic three and you will have a good start toward your goal.

The next big question to answer is: Why?

Why do you want to make the Mead you have planned? This simple question will lead you to make some very important changes, and perhaps result in a Mead more like the one you had imagined. For example, why did you choose the fruit that you are using? Is it just because you have a ton of it laying around? Or is there some particular aspect of it that you imagine will be delicious in a Mead? What honey will go well with the additional ingredients without either overwhelming them (a Buckwheat honey will dominate the subtle flavor of strawberries), or disappearing behind them (Clover honey will be very hard to detect in a Braggot)? By understanding your reasons for selecting your ingredients, you can match them better to compliment each other, creating wonderful layers of flavor and aroma. You can then gather the correct amounts, choose the right yeast, and start making the Mead you want.

You should now have decided what type of Mead you are going to make, and what type of honey you will be using, and what the additional ingredients will be. Next, you need to determine the amounts of each to use.

What size batch will you be making? A lot of NewBees start with 1 gallon jugs since they are easy to obtain, and are great for experimenting without spending huge sums of money. The next most common size is a 5 gallon batch due to the fact that most home brewing containers are of that volume. Note that adjusting a recipe up from a 1 gallon batch to a 5 gallon batch is as simple as multiplying the ingredients by 5. Same thing for 6 gallons, 6.5 gallons etc. etc. (Note that the volume of honey in a recipe is included in the total volume. So if a Show Mead recipe is scaled for 5 gallons, this means the total volume of the honey and the water is 5 gallons).

Next, how dry/sweet do you want it? Here at GotMead, the commonly accepted final gravities for each level of dry/sweetness are:

Dry: 0.990 - 1.006
Medium: 1.006 - 1.015
Sweet: 1.012 - 1.020
Dessert: 1.020 +

The NewBee Guide to Making Mead - Chapter 8: Recipe Calculations

Contributed by 3BlindMice
Tuesday, 07 February 2006
Last Updated Sunday, 07 June 2009

You will now have the basic list needed to begin calculating how much of each ingredient to use. The following example demonstrates how to go about this:

1. I am going to make a straight Show Mead with only honey.
2. I want it to have an alcohol content (ABV) of 14%.
3. I am going to make a 1 gallon batch.
4. I want it to finish Medium right around the 1.010 mark.

Step 1: How much honey is needed? In 1 gallon of Must, 3 oz. of honey will result in approximately 1% of alcohol. Therefore, to reach 14%, multiply the 3 oz. by 14.

3 oz. x 14 = 42 oz. = 2 lb. 10 oz.

But, you want to have some remaining sugar since you are aiming to finish the Mead medium. From the chart in Appendix 6, an SG of 1.010 is equivalent to 1.3% ABV. Therefore:

3 oz. x 1.3 = 4 oz

The total honey needed is therefore: 2 lb. 14 oz.

You may be asking if there is an easier way to get this figure. The answer is yes, thanks to JamesP. He created a very handy little calculator that allows you to select the batch size, honeys, and other ingredients, and calculates the SG for you (remember, some ingredients such as fruit, maple syrup etc. are fermentable and will affect the SG). You can even start with the SG you want, and it will tell you how much honey you need to add. The instructions on how to use the calculator can be found in Appendix 5.

The calculator can be found Here.

You can also use the table in Appendix 6 to figure out the honey amounts.

Step 2: Next, you need to select the yeast that will ferment to the level that you want. Chapter 9 explains in detail the characteristics of brewing yeast and provides a short list of available yeast and their alcohol tolerance. Since we are aiming for 14%, any of the yeast that can ferment up that point, for example Lalvin ICV-D47, will work. Any of the yeast that have a higher tolerance will eat through all of the honey, leaving the Mead dry rather than medium.

The NewBee Guide to Making Mead - Chapter 9: Yeast

Contributed by Angus
Saturday, 06 June 2009
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One of the key ingredients of Mead is the yeast. It has not been included in the Ingredients chapter since this particular item has its own unique variables that require a little additional thought by the brewer. Some recipes found in books or online call for a specific yeast, but it is up to the brewer to decide what they think will work best in their Mead (or what they actually can get their hands on).

The following are some of the variables to be considered in yeast selection:

Dry or Liquid:
The dry variety of yeast comes in various sized packages ranging from 5 grams – 80 grams. The foil packages are resilient to moisture and humidity. Each one contains a great many yeast cells as well as a small amount of nutrient to help the yeast start when rehydrated. This form can be stored for a long period of time, but the number of viable cells decreases the longer they are kept. The viability of the yeast can be extended if the packet is stored in the fridge, but anything over a year should really be avoided. It may be possible to resurrect an old packet by adding the powder to a yeast starter and seeing what happens, but make sure you have a second packet of new yeast on hand in case the older one proves useless. Various manufacturers recommend that you increase the amount of out of date yeast used by a certain percentage for the number of months over the expiration date. Each mead maker must weigh the risk of using old, out of date yeast against the investment in ingredients and decide whether to risk that investment with a product that may not work.

The liquid type also comes in two forms: Smack-packs and Vials. The Smack-pack is a 175 ml foil pouch that contains the yeast and a small inner sack of nutrient. The vial variety have a very large amount of yeast and are designed to be pitched directly into a 5 gallon batch unless the specific gravity is greater than 1.050, when it should be prepared in a yeast starter before pitching. Both varieties must be refrigerated before use to keep the yeast dormant, but they should be brought up to ambient temperature (~70o F) before pitching. For example, White Labs recommends that the yeast be removed from cold storage for 2 hours prior to inoculating your must. The advantage of using the liquid variety over the dry is that there are a great many more strains available to the brewer.
Alcohol Tolerance:

Each strain of yeast has it’s own unique tolerances to certain conditions. These include alcohol level, pH level, sugar level, etc. Of most concern to a brewer is the alcohol tolerance, since it is this value that will dictate the sweet/dry characteristic of the Mead. It is therefore important for the brewer to decide early on what level of sweetness is desired and to select the yeast based on it’s capacity to convert sugar to alcohol (known as Attenuation). Table 1 below lists the most common yeasts used by GotMead members and the alcohol tolerance they possess.

Table 1

Type	Alc. Tol	Temp.	Flocculation
Lalvin RC212	12 - 14%	59-86ºF	Low
Lalvin 71B-1122	14%	59-86ºF	Med
Lalvin ICVD47	12 - 14%	50-86ºF	Med
Lalvin EC-1118	18%	45-95ºF	Low
Lalvin K1-V1116	18 - 20%	59-86ºF	Low
Red Star Pasteur Champagne	18%	59-86ºF	Med-Low
Red Star Cotes Des Blancs (Epernay II)	12 - 14%	64-86ºF	Low
Red Star Flor Sherry	18 - 20%	59-86ºF	Low
Red Star Montrachet	13%	59-86ºF	Low
Red Star Premier Cuvee	18%	45-95ºF	Low
Red Star Pasteur Red	16%	64-86ºF	Low
Danstar Nottingham	12 - 15%	57-70ºF	High
Danstar Windsor	12 - 15%	64-74ºF	High
Doric Ale Yeast	12%	62-72ºF	Med
White Labs WLP720- Sweet Mead/Wine	15%	70-75ºF	Low
Wyeast 3632 Mead, Dry	18%	55-75ºF	High
Wyeast 3184 Mead, Sweet	11%	65-75ºF	High
Wyeast 3021 Prise de Mousse Champagne	17%	55-75ºF	High
Wyeast 3242 Chablis	12 - 13%	55-75ºF	High
Wyeast 3267 Bordeaux	14%	60-90ºF	Med-Low
Wyeast Eau de Vie	21%	65-80ºF	High
Fleishmann's Bread Yeast	12%		High

Temperature:
Really only a factor when looking at the location the Mead will be fermented in. Attempting to use a yeast in an environment outside of the temperature range may result in a stuck fermentation or possibly the production of unwanted compounds that could alter the flavor.

Flocculation:
This is the term used to describe the ability of the yeast to clump together and fall to the bottom of the fermentation vessel. The higher the flocculation, the clearer will be the Mead. It is also easier to rack off of yeast that creates a very compact Lees since the sediment will not be disturbed as easily by the siphon.

Preparation:

Dry: Follow the instruction on the packet to rehydrate the yeast. The manufacturer has formulated the contents for optimum readiness when prepared properly and any small changes can reduce the viable yeast count. The instructions from Scott Labs for rehydration are as follows:

If you're just rehydrating in water with no rehydration nutrient then 50 ml is the proper amount of water to use. Stir in the yeast GRADUALLY so as not to allow clumping and overmuch adherence to the sides of the vessel you are using for rehydration. Let stand 15-20 minutes, stir again to resuspend and inoculate your must.

If you're using GoFerm to rehydrate you'll use 17 ml H2O per gallon of must to be inoculated, and 1.25 grams of GoFerm per gram of yeast being used to inoculate the must (You're not going to rehydrate the yeast before you add it to the GoFerm mixture so you're eliminating the 50 ml of rehydration water that you would be using if you're just rehydrating and not using GoFerm).

So if you're going to make a 12 gallon batch of mead and inoculate it with 12 grams of D47, then you'll mix up your GoFerm as follows:

204 ml H2O (17 ml H2O X 12 gal must) at 111 F
15 grams of GoFerm (12 grams yeast X 1.25 grams GoFerm)

Heat your water to 111 F and mix in the GoFerm gradually.
Let cool to 104 F and add your yeast gradually stirring so as not to allow clumps to form.
Let stand 15 minutes, stir again and mix with an equal part of must (some people use 1/2 the amount of your rehydration suspension as well).
Let stand 15 minutes then innoculate your must with the GoFerm mixture.

Nota Bene: If there is an 18 degree or more difference in the temperature of the rehydration suspension and the must you'll need to do an additional step or steps in order to atemperate your rehydration suspension so as to mitigate shocking the yeast by adding it to a much cooler must. Just add another 1/2 portion of your total starter suspension (the yeast rehydrated in the GoFerm + the must you added) and wait another 15 minutes then inoculate your must.

If the yeast does not start foaming a little within 1 hour, you may have a bad batch and will have to either add it to a yeast starter, or get a new packet and rehydrate again.

Smack-pack: Feel the pack until you have located the inner sack of nutrient, and then slowly work it up to one end of the pack. Place the pack on a table and press down on the sack with you palm until you feel the inner sack break. This is sometimes a little hard to do, but don’t be afraid of pushing hard since the outer pack is designed to take the pressure. Shake the pack to mix up the contents, then place it somewhere warm until it has swelled to 1.5 - 2 inches thick. Plan ahead when using this type of yeast since you may need up to 5 or 6 days for the yeast to be ready to pitch. Add a day for each month that has passed since the pack was manufactured before it is ready to use. Once it has swollen appropriately, sanitize the outside of the pack properly before opening it and pitching the yeast directly into the Must. It helps to bring it to the same temperature as the Must to avoid shocking the yeast too much.

Vial: Bring the vial to the same temperature as the Must, sanitize the outside of the vial, and then pitch directly into the Must or yeast starter solution.

Go-Ferm® – This is a specific type of nutrient designed by Lallemand to provide the correct nutrients to help rehydrate their dry yeast. It creates a less stressful environment, which reduces the chance that the yeast will make SO2, H2S, or other unwanted compounds that will require aging to get rid of. They recommend a dosage of 1 part yeast to 1.25 parts Go-Ferm.
Note that other manufacturers of dry yeast sometimes include similar nutrients mixed in already, so the addition of Go-Ferm is not required, and can possibly be detrimental to the yeast. Only use it when rehydrating Lallemand (Lalvin) yeast.

Yeast Starter:

A yeast starter is an extremely useful way of ensuring a strong start to the fermentation and is used when you have the following conditions:
- You are using a Vial yeast in a Must with a specific gravity greater than 1.050.
- You have an old yeast (dry or liquid) and you want to make sure it is still viable.
- Your Must has a very high specific gravity (greater than 1.150)
- Your Must is very acidic or is lacking nutrients.

To make a yeast starter, sanitize a small container and add 2 cups of either juice, prepared Must, or water with 0.5 cups of Extra Light Dry Malt Extract. Add 0.5 tsp. of nutrient (not DAP or Fermaid K as the ammonia salts can be toxic at high levels to first generation yeast), seal the container and shake vigorously to aerate the solution. If you are using dry yeast, rehydrate it according to the manufacturer’s instructions. Bring the starter solution to 95°F, add the yeast and cover with either a sanitized cloth, some foil, or with an airlock if possible. Let it stand in a warm location for 12 to 24 hours before pitching into the Must. Be aware that the type of liquid used may affect the flavor of the Mead, particularly if too much is used. Lighter juices such as white grape or apple juice will not add color or much flavor to the Must.

Basic List of Yeast:

The following yeast are recommended by Pete for the type of Mead being made. This does not mean that changes or substitutions cannot be made, but they are a good starting point.

D47, 71B - Sweet/Semi-Sweet Traditional and Show Meads
K1-V1116, RC212 - Dry Traditional Meads
71B - berry melomels
K1-V1116 - Cysers (although EC-1118 and D47 well too)
RC-212 - dark grape pyments
DV10, EC1118 - sparkling mead base
K1-V1116, D47 – Metheglins

Additional Information:

The subject of yeast selection and preparation is a very lengthy one and can take years to learn. The information provided above covers the basics of yeast and what the brewer needs to be aware of when making their first Mead. Below are provided some links that will give you some additional information on yeast rehydration and nutrient addition.

Lallemand Nutrient Additions

Goferm Rehydration

Fermentation Guidelines

It is important to understand a little of the lifecycle of the yeast so that the brewer can understand what is happening at a particular stage, and can provide the correct nutrients for the yeast. Understanding the impact of nutrients is key to a healthy colony of yeast that will produce a clean fermentation. Chapter 10 explains the different types of nutrients available, how they affect the yeast, and what to watch out for.

The Newbee Guide to Making Mead - Chapter 10: Nutrients

Contributed by 3BlindMice
Thursday, 29 December 2005
Last Updated Tuesday, 23 February 2010

As with any living organism, Yeast have to be fed to survive. Unfortunately, honey does not have much in the way of nutrients, particularly if it has been boiled. It is therefore up to the brewer to ensure the right combination of nutrients is added to the Must to ensure a healthy fermentation. If this is not done, then the Mead could experience a number of negative results, such as Stuck Fermentation and Hydrogen Sulfide Contamination (Rotten Egg Smell). Fortunately, it is fairly easy to meet the nutritional needs of the yeast.

Yeast Life-Cycle:

Once yeast have been placed into a solution of oxygen, nutrients, and food, they begin to prepare themselves for growing. This does not mean the individual yeast will grow, rather that they will begin to multiply (i.e. grow the colony). To do this, they will immediately begin to suck up as many nutrients as possible (the Lag phase), will begin to reproduce (Accelerating Growth phase), will reproduce rapidly (Exponential Growth phase), will slow down as the nutrients are depleted (Decelerating Growth phase), and finally will maintain their numbers (Stationary phase). Each stage correlates directly to the amount of nutrient provided.

Lag Phase: This occurs during the first few hours after addition of the yeast, during which there are no apparent signs of fermentation or growth. The yeast are becoming acclimated to their new environment. The yeast may be "shocked" by their new environment and it may take some time to adjust. They absorb all of the available oxygen, using it to synthesize all the enzymes and other building blocks needed for growth and fermentation, and storing oxygen up in the form of sterols for later use. This stage is critical to fermentation and should occur as rapidly as possible, preferably within a few hours, so lots of oxygen is needed at the start.

Accelerating Growth Phase: The yeast cells start to grow and divide, and some fermentation will begin. The yeast store the sugars they absorb for later use.

Exponential Growth Phase: The yeast's rate of reproduction and metabolism is at its highest, dividing every 90 - 180 minutes, resulting in an increase in numbers of up to 1000 times in 24 hours. Fermentation begins in earnest and a Krausen may be beginning to form.

Decelerating Growth Phase: This should occur between 12 to 24 hours after pitching. At this time the oxygen is fully depleted and fermentation and CO2 production is taking over. Lots of bubbling should be occurring at this stage.

Stationary Phase: During this time the fermentables and nutrients are completely consumed. All yeast growth has stopped and they are beginning to fall out of suspension or flocculate. The stored oxygen and sugars inside the yeast will begin to be used to continue growth. Prolonged exposure in this phase (weeks) can lead to autolysis or total breakdown of the cell.

The goal of the brewer is to make sure that the correct amount of nutrients are added at every stage during the Yeast's life-cycle to ensure they have what they need to be healthy. Healthy yeast leads to fewer esters and sulfur compounds being produced. Beware though that too much nutrients, or oxygen added after around day 3, will create additional problems. Learn what to look out for to know what stage your yeast are in, and dose them appropriately.

Oxygen:

Yeast is a peculiar organism in that it does not necessarily need straight oxygen to survive. Instead, it can obtain the O2 required to reproduce by fermenting any available sugars. But, since O2 is used to build up strong cell walls, the yeast is able to reproduce far quicker, and with fewer unwanted byproducts, if it can get the O2 without having to break it off from the sugar molecules. It is therefore important to dissolve O2 into the Must before the yeast is pitched, and to add more for the first 2 to 3 days until the yeast population has grown sufficiently. This is a fairly simple process and can be achieved in a number of ways:
- When pouring the water (or Must if you have heated or boiled the mixture) into the fermenter, make sure it splashes a lot so that you can see a lot of air bubbles. Pouring it through a strainer or a funnel achieves this.
- If you are siphoning the Must, hold the end of the tube near the top of the fermenter to allow the liquid to fall freely through the air.
- If you are using a 1gallon Carboy as the primary, pick it up and shake it for at least 5 minutes (if you feel strong enough to do this to a 5 gallon Carboy, go ahead but be aware that they can be slippery when wet).
- Stir the Must vigorously with a long handled spoon for at least 5 minutes.
- Use a Lees Stirrer or Wine Degasser attached to an electric drill.
- Use a 0.5 micron stainless steel aeration stone and either an O2 tank for at least 2 minutes or an aquarium pump fitted with an in-line filter for at least 5 minutes.

Whichever method you choose, make sure that you completely sanitize the tool before each use. Also, boiling the Must drives out any dissolved oxygen so it is very important to add it back in some way.

Nitrogen:

Yeast have two types of nitrogen they are looking for when metabolizing the honey into Mead: YANC (Yeast Assimilable Nitrogen Content) and FAN (Free Amino Nitrogen). YANC includes all of the assimilable nitrogen from ammonium ions and the assimilable FAN present in the juice/must. Nitrogen is essential for the yeast to be able to reproduce. Without a growing yeast population, the fermentation will be extremely slow and may stop altogether if the yeast you do have conk out on you. Nitrogen also helps the yeast build up a tolerance for alcohol, which will not only help prevent a stuck fermentation, but will allow the brewer to create Meads with a higher ABV. Yeast use Nitrogen to create natural enzymes that clarify and age the Mead quicker. Finally, low levels of YANC are associated with the production of undesirable sulfide compounds (H_2S).

Nitrogen sources are available from most Homebrew stores and are called “Yeast Nutrient”. Generally, yeast need a range of 250 ppm-350 ppm or higher depending on the initial Gravity/Brix level of the must. This is why it is often necessary to supplement the available nitrogen.

Micronutrients:

Basically, these are anything else needed by the yeast to build strong cell walls, reproduce, build up tolerance to alcohol, and prevent the production of unwanted compounds that can change the flavor of the Mead. Vitamins and minerals needed include amino acids, urea, phosphorous, citric and pantothenic acids. The micronutrients are often called “Yeast Energizer”by most Homebrew stores.

Sources:

The following are some of the commercial sources for the required nutrients:
- DAP (Diammonium Phosphate) - Contains fermentable Nitrogen and phosphorus.
- Fermax - contains diammonium phosphate, dipotassium phosphate, magnesium sulfate, autolyzed yeast.
- Fermaid K - A more complete nutrient than DAP, it contains a variety of compounds such as amino acids, sterols, yeast hulls, and vitamins; also contains a limited concentration of fermentable nitrogen. It supplements the thiamine levels in the Must, which if too low will cause excess H_2S production. It also supplements the Pantothenate levels which if too low will cause excess volatile acid production.

- Yeast Hulls Commercial brand is Ghostex. The remains of dead yeast in powder form. The hulls provide lipids for your yeast to build strong cell walls, and absorb autotoxic yeast byproducts that could inhibit alcoholic and malolactic fermentations. They can be used if you encounter a stuck or sluggish fermentation.

Note that many Homebrew stores have their own mixture that they provide, often with no name other than “Nutrient” and “Energizer” but each will have a similar combination of compounds that give the yeast what they need.

Dosage:

DAP - 1/4 tsp per Gallon. For a 5 gallon batch, dose the Must at a rate of 1/2 tsp a day for the first three days while aerating. That way the DAP is mixed in and the Must aerated at the same time. 2 teaspoons per five gallon batch is plenty if a single dose is being made before pitching the yeast.

Fermaid K - 1 gram (1/4 tsp) per gallon of Fermaid K at 1/3 sugar break.

Use both Fermaid K and DAP before adding the yeast, especially in lower color honeys. Initially, the nitrogen in DAP is adsorbed very readily. As the fermentation progresses, use Fermaid K and supplement with yeast hulls. The nitrogen from the amino acids (in the Fermaid K) is absorbed more easily further along in the fermentation than from ammonia salts (DAP).

Note that some manufacturers make products that require slightly different dosage amounts, so it is important to read the instructions carefully. Wyeast, for example, have a yeast nutrient that instructs the brewer to use only 1 tsp. for 5 gallons.

Warning: Do not use too much of either or you risk changing the flavor of the Mead and creating compounds that may spoil your batch.

If there is no Homebrew store nearby, it is possible to use alternatives for the nutrients. For example, certain fruit have sufficient nitrogen and minerals in them for a healthy fermentation. Raisins are an excellent choice, although it must be noted that the flavor profile of the Mead will be changed if they are used. Use between 5 to 10 raisins per gallon of Must, crushing them or cutting them in half to allow the yeast to reach the inner pulp. In the case of a Braggot, the addition of the malt extract also gives the yeast sufficient nutrients.

Using nutrients is not an absolute necessity. Many brewers prefer the straight Honey/water/yeast method and they achieve very good results. If you attempt to brew without any additions and encounter a stuck fermentation, add a little energizer or yeast hulls to get the process working again.

The NewBee Guide to Making Mead - Chapter 11: Mead Day

Contributed by 3BlindMice
Tuesday, 07 February 2006
Last Updated Tuesday, 23 February 2010

Brew day is here, and you should now have the ingredients ready to go, the yeast prepared, the nutrients measured, the equipment laid out, and a glass of Mead at hand. You are now ready to brew your Mead.

The first thing to do is to make sure the area you will be in and the equipment you will be using are ready for use. This means cleaning and sanitizing as much as possible to avoid infections. Chapter 12 runs through the methods to follow to achieve this.

Then, it is time to start to prepare your Must. There are three methods used to mix everything together: Boil, No Boil, and Pasteurize. No single method is “correct”, so read Chapter 13 to gain an insight into the pros and cons of each before deciding on which method you will use.

Keeping records:
This is a very important part of the brewing process as it can not only help you reproduce a good Mead, but it can identify what might have gone wrong if a batch turns out bad. Keep very good notes describing exactly how everything was done, and continue adding to the notes as the Mead matures, right up to the point where it is ready to drink. The notes should include the recipe, the process used, any observations (such as the time it took to start fermenting, or how long fermentation took to completion), how the Mead looks and smells, any problems encountered, and how it tasted after aging. Appendix 8 provides a sample Mead recipe and notes showing the sort of things that should be included.

The GotMead format for recipes is as follows:

Recipe Name

Brew Date: xx/xx/xx
Batch Size: x gal.
Honey Varietal: xxxxxx
S.G. goal: 1.xxx
%ABV goal: xx%

Ingredients:
xx Lbs. Honey
xx gal. Liquid (water/apple cider etc.)
xx Lbs. Other ingredients
xx oz. DAP/Energizer
xx oz. Yeast
etc.

Process:
Prep method (including times, amounts, temperatures, acid level, processes and observations)

Continued notes and comments (additions, aerations, rackings etc.) up to bottling and tasting notes.

Using a standard brewlog will help tremendously with keeping things organized. A very useful one was created by Wrathwilde and is available for download as a PDF here.

The NewBee Guide to Making Mead - Chapter 12: Sanitation

Contributed by
Wednesday, 08 February 2006
Last Updated Sunday, 07 June 2009

Probably the most important aspect of home brewing is sanitation. If you are not starting with a clean environment, you may find yourself brewing some fairly nasty concoctions. One of the worst things a home brewer has to face is the prospect of pouring 5 gallons of undrinkable liquid down the drain. So, as you prepare to mix your first batch, repeat these words over and over before ever even touching your ingredients: Sanitize Everything!

Step 1: Location

Location is often dictated by what space you have available to work in, usually the kitchen. Needless to say, certain actions can be taken to avoid contamination. Try not to have any open windows, particularly on windy days, and turn any fans off that are blowing in your direction. Put away all vinegars as you run the risk of creating your own honey based vinegar. Dust and mop the area leaving enough time for any floating dust to settle before starting. If you have doors without a threshold that allow dirt, dust and wind to blow through, then it is a good idea to place a towel across the bottom of the door to keep things from blowing in while you make your Mead. Banish your pets, and any other two or four legged friends from your Meadmaking area if they have not undergone the same cleaning regimen as you have (see Step 3 below). Every little bit that seems insignificant helps to ensure that you are not introducing contamination into your Must. It's also a good idea to make a note of the pollen count and type in your area. You can check that out on the internet here.

Step 2: Timing

Start to sanitize your equipment about 15 minutes before you will use it. Any earlier and you risk extra build up of unwanted spoilers. Any later and, depending on the method being used, you may not have given yourself enough time to kill everything.

Step 3: Yourself

You will be handling your equipment, so it does not hurt to start off clean yourself. Clean tight fitting shirts/clothing, hats to keep hair out of your Must, and clipped fingernails that have been scrubbed before starting are highly suggested. Some Mazers even recommend showering after cleaning and before starting to make their Mead, to add that extra little bit of cleanliness to the process. Wash your hands with some antibacterial soap or use hand sanitizer before touching anything.

Step 4: Surfaces

Clean the surfaces you will be working on. You can never completely remove all of the bacteria and spores floating around you as you prepare your Must, but getting rid of as many as possible reduces the chances of contamination. Be aware that, just because you wiped the countertop with disinfectant, you cannot rest your equipment on it and think they will remain clean (nasty batch of Nut Brown Ale brought that lesson home a long time ago).

Step 5: Sanitation

The primary method of sanitizing your equipment is to make sure it is free of debris. If there is gunk stuck to the walls or bottom, or if it smells stale, then it is not clean enough. Bacteria, molds, yeast, etc. can hide in this gunk and will contaminate the Must as soon as it is added. So step one is to grab a bottle brush and to scrub hard using liberal amounts of detergent/soap and hot water. Keep rinsing and scrubbing until the inside of the carboy or bucket is clear of all junk and you can detect no smells. The same goes for your bungs, air-locks, tubing, racking canes or anything else that will come into contact with the Must.

A word of warning here: plastic scratches fairly easily. Bacteria are small enough to lodge nicely in these scratches, and are extremely difficult to remove once there. If you are using a plastic bucket for your primary fermenter, do not use highly abrasive brushes or you risk ruining it for future use. Instead, use a soft bristled brush, sponge, or cloth, along with some elbow grease and plenty of hot water.

If you have some very resilient scum that is hard to reach or remove, fill the container up with hot water and let it soak overnight.

Step 6: Sterilization

100% sterilization is not possible in the kind of environment most of us make our Mead in. This is because there are always bacteria, spores, and wild yeasts floating around us, sitting on us, and doing their best to get in where they are not wanted. We must therefore do our best to get rid of the great majority so as to give our brewing yeast a head start in the Must. There are two ways of doing this; by using heat or chemicals.

First, heat. This can be accomplished by either placing the equipment in boiling water for at least 1 minute, or by heating the water to pasteurizing temperatures and keeping it there for enough time to kill anything still lurking. The following

table provides the temperature vs. time required to achieve sterilization:

Table 1: Pasteuraization Temperatures:Temperature (°F/°C)Time (minutes)123/51470130/55170135/5760140/6022145/637.5150/662.8**155/681.0**

** Extrapolated from logarithmic curve constructed from Townsend's data.

Of course, not all equipment can take this kind of heat, particularly plastics, so be careful when deciding what to immerse in the hot water. I have personally boiled bungs, airlocks, and turkey basters (used for taking samples), but not siphon tubing, racking canes, or bottle fillers.

Second, chemicals. There are a whole slew of chemicals out there that can be used to sanitize and sterilize, from regular household bleach to specialty brewery sanitizers. Each one has its unique methods of use, such as needing to be rinsed after immersion, so it is important to read the instructions. Below are the most common chemicals used by homebrewers (not in order of popularity):Table 2: Sanitation Chemicals:Product
Bleach
K-Metabisulfite
B Brite/C Brite
Iodophor
Star San
Saniclean
Powdered Brewery Wash
Straight A
Beer/Wine Line Cleaner
Easy Clean
Na-Metabisulfite

Of all of them, bleach is probably the most used as it is cheap and extremely easy to find. Make sure to use the straight unscented kind to avoid adding that lemony scent to your Mead. It is most convenient to use the 5 gallon primary fermentation bucket to soak everything in as you will be sanitizing the bucket anyway. A water tray used for hanging wallpaper is the ideal length for the longer pieces such as a racking cane.

Opinions on concentration of bleach needed differ, but 1 Tbs. (or 0.5 fl. oz., 14.8 ml) per 1 gallon (3.72 litres) of water will do the trick (that’s 0.5 cups of bleach per 5 gallons of water). Let the equipment sit for at least 15 minutes completely filled or immersed in the solution. Rinse everything thoroughly with fresh tap water and continue rinsing until there is absolutely no residual smell of chlorine detectable. Make sure to place each rinsed piece inside another sanitized container and avoid letting them touch anything else prior to use.

Following these instructions to the letter is not an absolute requirement to produce great Mead. Many people avoid infection by just following the simple instruction of 'Sanitize anything that will come into contact with the Must'. Although you cannot be 100% clean, following this method should result in an environment sufficiently free of microorganisms and opportunistic pathogens that could ruin your batch of Mead.

There are various sanitation chemicals that can be used, each with their own unique qualities. The following chart lists a few of them, but there are others that are available from your local Homebrew Store. Talk to the owner to get a better idea of what will work best for you. If the only thing available to you is bleach, then make sure you rinse everything very well to eliminate all of the smell before using.

Note: It is important to follow the instructions on the container when using these chemicals, particularly if there may be some mixing. The combination of different chemical compounds can result in the release of poisonous gases. If you are in any doubt as to the results of mixing, play it safe and don”t do it.

Agent Use Mixture Contact Time Rinse/No Rinse Environment Friendly? Cost* 1 Stepsanitize 1 tbs/gal 2 mins No Rinse friendly$2.50/lb OxyClean clean 1-3 tbs/5 gal as required Extremely Well friendly$2.50/lb PBW clean 1-3 tbs/5 gal as requiredExtremely Well friendly $6.95/lb Straight-A clean 1-3 tbs/5 gal as required Extremely
Well friendly $3.75/lb Bleach sanitize 1 tbs/gal 15 minutes Extremely Well unfriendly $1.75/gal Diversol sanitize 1 tbs/gal 15 minutes yes friendly Iodophor sanitize read instr 60 seconds no unfriendly $7/16 oz Star San sanitize read instr 60 seconds no friendly $7/16 oz B-Brite both 1 tbs/gal 15 seconds Extremely Well friendly $2.50/lb* These costs are an average based on availability over the internet or in stores. Prices may vary on location.

The Newbee Guide to Making Mead - Chapter 13: Preparation and Mixing

Contributed by
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The three methods for mixing the Must (the Boil method, the Pasteurization method, and the No Heat method) are all accepted and easy to complete, so it is entirely up to the individual as to what method to use. Each has its own pros and cons, but it is important to point out that no single one is the “right” way.
The Boil Method:
This is a tried and true method of preparing the Must and is favored by those who wish to make Mead based on historical or period recipes.

Pros:
- The Must is sanitized by the boil, reducing the chances of contamination.
- Particles, such as bee bits, wax, pollen etc., are removed as scum.
- The honey is thoroughly dissolved into the water.

Cons:
- The Must has to be cooled before pouring it into the fermenter, exposing it to possible contamination.
- The honey may be burnt during the pour (as discussed below).
- Some of the “essence” of the honey is lost by being boiled off. The character of honey is made up of the unique flavors and smells derived from the flowers it was collected from. As you boil the Must, you can smell the honey, which is actually some of those floral essences evaporating away.
- Valuable proteins, enzymes and varietal characters are lost as they are boiled and are skimmed off with the “scum” that is being removed. This will detract from the final taste of the Mead and cannot be avoided using this method.

If boiling is the method you prefer, there are some things that can be done to avoid the con of waiting for the must to cool. First, cool the Must by only boiling a quarter of the water with the honey. Pour the remaining cold water into the fermenter before adding the Must. Not only will this help bring the temperature down rapidly, it will also allow you to seal the container while it continues to cool, reducing the chances of contamination. Second, stir the water as it boils to avoid burning.

Method: Place the total water into a pot and bring it to a boil. Add the honey, stirring constantly with a spoon as you pour. Honey is heavier than water and will immediately sink to the bottom, coming into contact with the hot metal of the pot. This could result in burnt sugars and a ruined batch. Continue boiling the mixture for 15 minutes, skimming off the scum that forms using a sanitized spoon. After boiling is complete, cool the Must before adding it to the fermentation vessel.

Warning: Do not pour boiling hot Must into a glass fermenter as the thermal shock could result in cracked glass and a potential burn hazard. Always let it cool first or pour it onto cold water.

The Pasteurization Method:

Most yeast and bacteria cannot withstand high temperatures for a prolonged period of time. The hotter the environment, the less time it takes for the micro-organisms to be killed. Pasteurization is the process of heating and maintaining a liquid at a temperature that will denature any bacteria present without the need for boiling.

Pros:
- The honey is thoroughly dissolved into the water.
- Not all of the volatile components of the honey are lost, maintaining some of the flavor and aroma in the Mead.
- Cooling is achieved far quicker.
- Denaturing of the proteins in honey results in Meads that clear more easily.
- Particles, such as bee bits, wax, pollen etc., are removed as scum.

Cons:
- Unfortunately, as with the Boiling method above, some of the delicate varietal and floral characters of the honey are still lost. You are cooking the honey and destroying some of the desirable complexities and beneficial enzymes and proteins.
- Cool down time exposes the Must to potential contamination, although it is fairly easy to cover the hot liquid to minimize any airborne intrusions.

The main advantage of this method is that the Must can be heated to a fairly low temperature and kept there for a specified length of time. The cooler the temperature, the longer it must be heated. Table 1 lists the times required for specific temperatures for pasteurization to be achieved:
Table 1Time (minutes)Temperature
(°F) 470 123 170 130 60 135 22 140 7.5 145 2.8** 150 1.0** 155 ** Extrapolated from Logarithmic CurveMethod:
Heat the a large pot up to at least 140°F. Pour in the honey, stirring continuously until completely dissolved, and then bring the water back to the temperature selected from Table 1. Maintain the Must at that temperature for the time specified for the given temperature, then cool and transfer into the fermenter. The No Boil Method:A repeat is in order concerning honey and it’s natural ability to fend off the affects of yeast. The sugar/water ratio of honey is skewed toward the sugar side so much that it is extremely difficult for yeast to take hold in straight honey. This does not mean that it cannot happen, but it would have to be a very tough yeast to be able to survive in such a “dry’ environment. This means that the honey you add to

the water will likely not be carrying any unwanted wild yeasts with it. Any that are present will be so overwhelmed by the huge influx of yeast you will be adding, they will not have much of a chance to take hold and ruin your Mead. It is therefore possible to mix the honey with the water without boiling and still make a high quality product.

Pros:

- Not boiling the honey greatly minimizes the loss of any volatile components in the honey, resulting in a Mead that retains much of the true floral flavor and bouquet of the honey varietal being used.
- No boiling, no heating, no fuss. Easy and quick.
- You can pitch the yeast immediately since the Must is already at the correct temperature. Cons:
- Slight potential for contamination, mostly from the water supply rather than the honey.
- Harder to dissolve the honey. Most new Mead makers completely underestimate the stirring involved for complete dissolution of the honey into the water and as a result leave some unblended honey at the bottom of the vessel. Stratification of the must can slow, stress or stall your fermentation and result in off flavors. Get ready for a good deal of shaking.
- The chlorine must be removed from chlorinated water prior to pitching of the yeast, or distilled water used.Method:

Pour approximately 25% of the total water volume to the fermenter. It helps at this point to warm the honey slightly by placing the containers in some warm water. You do not want to get the honey too hot, but just warm enough to flow easily. Add the honey to the water. Cover the carboy with a sanitized lid (or use some plastic wrap straight from the roll), and begin to shake vigorously until the honey is completely dissolved. Add water to bring it up to the desired level. If you are using an open bucket fermenter, use a sanitized stirrer, spoon, or whisk to agitate the liquid and help dissolve the honey. A wine “whip degasser” or “lees stirrer” attached to a power drill are frequently used by those craggy old experienced Mead makers who are otherwise too lazy to stir by hand. They make quick work of blending the honey and as an added bonus, they aerate the heck out of your mead so it is chock full of oxygen when you pitch your yeast.It is during the mixing of the Must that other ingredients such as nutrients, spices, fruits, teas etc. are added to provide flavor or character to the Mead.

The NewBee Guide to Making Mead - Chapter 14: Into the Fermenter

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At this point, you should have the following ready to go:
- Boiled or pasteurized Must (or warm water and honey if using the no-heat method).
- Additional Ingredients prepared.
- Rehydrated yeast or prepared liquid Yeast.
- Sanitized fermentation vessel.
- Sanitized additional equipment such as a funnel, spoon, bung, airlock etc.
- Yeast Nutrients and/or Energizer (if not already added during the boil)

You are now ready to add everything to the primary fermenter and pitch the yeast. Follow each step, skipping the ones that do not apply depending on whether the boil/pasteurizing/no-heat method was used.

Step 1: Cool the Must (boil/pasteurize method)

It is important to cool the Must as quickly as possible to avoid possible contamination from floating bacteria or yeasts. This can be done by the following methods:
- Place the pot into a bath filled with ice-water.
- Add sanitized bags of frozen water to the Must. Remove the bags of melted water when done. Make sure the water in the bags is clean in case there is a leak in one of them.
- Add ice to the Must. Do not use commercial ice as this is not always made of clean water. If you are going to do this method, freeze pure filtered water in bags and take the plastic off the ice before adding them to the Must.
- Use an immersion cooler (available from Homebrew stores).

Step 2: Mixing the Honey and Water (no-heat method)

Gently heat the honey to make it flow easier out of the container. This is best done by placing the honey container in a pan filled with hot water for a few minutes. Add 2/5th of clean warm water to the fermenter (e.g. 2 gallons of water for a 5 gallon batch) and pour the honey in. Mix the liquid well to help dissolve all of the honey. You want to avoid leaving any undissolved honey sitting on the bottom of the fermenter.

Step 3: Add Additional Ingredients

If you are adding fruit, spices, fruit juice etc., put them into the fermenter now. Add the Nutrients if they have not already been added during the boil.

Step 4: Pouring in the Must

Add 1/5th of the total volume of water to the fermenter (e.g. 1 gallon of cold water if making a 5 gallon batch). This will help prevent thermal shock on the fermenter that could result in cracking of the glass and spilling of the hot Must. This is not a great problem if using a plastic fermenter, but is still a good habit to get into. Using refrigerated water also helps cool the Must down quicker.

If the fermenter is a plastic bucket, pour the Must in letting it splash as much as possible. If using a glass or plastic Carboy, pour it in through a funnel. Letting the Must mix with as much air as possible will help dissolve oxygen into the liquid.

Step 5: Bring up to Volume

Add cold water to bring the total volume up to the desired batch size.

Step 6: Oxygenate the Must

There are a few ways to do this, each dependant on the type of equipment you have (see Chapter 4: Equipment). No matter what method you use, the goal is to provide the yeast with as much oxygen as possible for a healthy ferment, while avoiding contamination.

The following are the most popular methods:
- For small containers, such as gallon jugs, cover the mouth of the container with a lid or by holding cling-film over the hole. Pick up the container and shake like crazy for at least 5 minutes. This method is sometimes best done before adding the top up water since the more airspace you have in the fermenter, the more oxygen will be dissolved into the Must.
- For open buckets, use a long handled spoon and stir violently for 10 minutes, or use a lees stirrer connected to a cordless drill for at least 5 minutes.
- For glass Carboys, use a lees stirrer connected to a cordless drill for at least 5 minutes.
- Use a 0.5 micron stainless steel airstone and pure O2 for 2 minutes.

- Take a couple of cups of the Must in a sanitized blender and whip it up for 2 minutes before returning it to the fermenter.

Step 7: Pitch the Yeast

Make sure to check the temperature of the Must with a sanitized thermometer before pitching the yeast. It should be below 90°F to prevent shocking the yeast or killing them outright. Pour the yeast slurry straight into the Must and gently rock the fermenter to ensure it mixes in well. Try to avoid letting any of the yeast run down the side of the fermenter as you pour it in.

Step 8: Cover

If you are planning on using an open-fermentation method for the first 3 days, place a clean cloth of the fermenter. If you plan on sealing the fermenter from the atmosphere to avoid potential contamination, use the sanitized rubber stopper and airlock (the bucket lid should have a hole drilled the correct size for the rubber stopper).

Step 9: Cleanup

When you have finished mixing everything and the Must is in the fermenter, don’t forget to give all of your used equipment a really good washing with some hot water and a brush. By doing this, you reduce the chances of grunge and grime drying out on the inside surfaces where they can be particularly difficult to remove. These nasty remnants of previous brews can harbor those unwanted yeast and bacteria that can turn a promising batch bad very quickly.

The NewBee Guide to Making Mead - Chapter 15: Aeration, Fermentation and Racking

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The Must should now be sitting in a cool location, approximately 65-70°F, away from any light. Some activity should be noticeable within a couple of hours of the yeast addition, but this may take a little longer. Be patient. The yeast are going through the lag phase before they start their growth phase, so very little in the way of activity may be observable. By way of reminder of the lifecycle of the yeast:

Lag Phase:

The period during which the yeast are acclimatizing themselves to their new environment, and taking in the nutrients they need to grow and reproduce. This can take anything from a couple to a few hours depending on gravity, acidity, temperature, yeast population size, nutrients, etc. The end of the Lag phase is marked by the formation of Krausen, a layer of foam on top of the Must. At this point, the addition of some nutrients may be beneficial. Recommended dosage is 2/3 of a teaspoon (3.5 grams) of Fermaid K and 1/3 of a teaspoon (1.5 grams) of DAP for a 5 gallon batch.

Growth Phase:

The yeast begin to multiply, exponentially, until the nutrients are depleted. This is the period during which aeration is important (see below).

Fermentation Phase:

The yeast switch from aerobic to anaerobic metabolism, which means they get their energy and oxygen from the sugar (in this case, the honey), and produce ethanol.

Aeration:

To avoid stressing the yeast during their growth phase, it is important to provide them with the oxygen they need. Aerate the Must a couple of times a day for the first three days by using an aeration stone, shaking, or stirring with a Lees stirrer. Make sure you sanitize whatever equipment you are going to use before putting it into the Must. Aerate for 2 to 5 minutes depending on the method, and then cover the Must again. WARNING - There will be CO2 dissolved in the solution that will begin to bubble out when you begin to aerate the must. This can sometimes result in a geyser effect that could spray your walls and ceiling, and will result in the loss of some of the must. To avoid this, gently agitate the liquid to expel the CO2 before you begin to add the oxygen. This is particularly important if you are using the shaking method.

Fermentation:

Bubbling through the airlock should start in earnest on approximately the second or third day. This is the fermentation phase when the yeast are converting the sugars into alcohol. Nothing is required at this point except to leave it be. Check in on it every couple of days to see how active the bubbling is. As soon as it slows to approximately 1 bubble every 30 seconds, it is ready to move onto the next stage – Racking.

Cap Management:

When fruit is being used as an ingredient, it has the habit of floating on top of the Mead, creating what is called a Cap. This can cause a couple of issues with the fermentation, the most crucial of which is the potential for contamination. When the cap sits for an extended period of time on top of the Mead, it can begin to dry out, creating a crust on which mold can grow. This mold will then contaminate the Mead, creating off flavors. The cap can also restrict the bubbling of the carbon dioxide, which will build up in the Mead and slow down the fermentation. To prevent the cap from drying out, and to aid in the release of the CO2, the cap needs to be “punched” down a couple of times a day. This requires nothing more than to gentle stir the fruit back down into the Mead using a sanitized spoon.

Racking:

The purpose of racking is fourfold:
- To stop fermentation by removing the Mead from the yeast and adding Sulfites and Sorbates.

- To remove the Mead from the Lees (layer of yeast on the bottom of the fermenter) so as to avoid a yeasty flavor imparted by the breakdown of yeast cells before bulk aging.

- To add additional ingredients for flavor during secondary fermentation.

- To help clarification by removing the Mead from the Lees before bottling.

It is absolutely vital that the Mead not be mixed with too much air during racking as this will introduce oxygen that will affect the flavor. Also, as always, make sure all of the equipment that will be coming into contact with the Mead is thoroughly sanitized.

1. If your purpose for racking is to stop fermentation and to clarify the Mead, put the carboy into a fridge for a week. This will help a lot of the suspended matter to drop down into the lees.

2. Move the full carboy up onto a counter or table at least a day before you intend to rack. Any yeast that is disturbed will have time to settle back down into the lees.

3. If you intend to rack onto fruit, spices, oak, sulfites, sorbates etc., add them to the secondary fermenter before racking the Mead. You do not want to find that you have overfilled the secondary and do not have room for the additional ingredients.

4. Siphon carefully (see Chapter 16) taking a small sample to test the specific gravity and taste.

5. If you can, blanket the Mead in a small amount of carbon dioxide to help prevent oxidation.

6. Seal the secondary fermenter with an airlock.

It is important to note here that it is not necessary to rack the Mead before you bottle it. Racking is helpful in clarification and when you are adding ingredients or back-sweetening. It is possible to leave the Mead in the fermenter right up to the point that you intend to bottle, but you run the risk of transferring the yeast as well.

The NewBee Guide to Making Mead - Chapter 16: Siphoning

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Siphoning is actually a very important part of brewing and therefore requires a little more attention. It is during the siphoning that things can go horribly wrong if care is not taken. Therefore, please follow the guidelines as closely as possible to avoid contaminating or aerating your Mead.

- Sanitize everything thoroughly.

- Move your Mead onto a table at least a day before you intend to siphon. This will give the yeast time to settle out again and will minimize transfer.

- If you have a way to fill the receiving vessel with CO2, do so before starting the flow. This will help minimize the oxygenation.

- Always have the end of the siphon tube below the surface of the Mead to avoid exposing the flow to the air.

- There are three easy ways to start the flow: sucking, water priming, and using an AutoSiphon.

Sucking: easy, but runs the risk of contamination from the mouth. If this is the method you choose, you can minimize the risk by taking a good mouthful of some strong alcohol, such as Vodka or Peppermint Schnapps, and gargling for a minute (spitting out is optional at this point).

Water Priming: a very easy and effective method of starting the flow. Place your secondary carboy or bottles in an empty container, such as a large pan or bucket. Fill the racking cane and hose with sanitized water (do NOT use bleach water or any solution that requires rinsing). Place your clean fingers over the ends of the tube to prevent the water from draining out. Hold the exit end lower than the surface where the Mead is resting and point it into the container your empty carboy is resting in. Place the other end into your Mead and take your finger off the exit end. The water will start to flow, pulling the Mead with it. When the Mead starts to exit the tube, quickly cover the end again with your finger and move the tube into your carboy/bottles. Take your finger off and the Mead will continue to flow.

Autosiphon: a nice little tool that allows the user to start the flow just by pumping the racking cane. Very easy to use and sanitary, but does not fit into the neck of most 1 gallon wine jugs.

See Chapter 18 for techniques in bottling.

The NewBee Guide to Making Mead - Chapter 17: Aging and Oaking

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Mead is basically a wine, and therefore does benefit from a certain amount of aging. This is not to say that no Meads can be enjoyed within a few weeks of fermentation (see Joe’s Ancient Orange), but even these Meads will improve if given a little time to mature. Aging allows the desired flavors to blend and come to the front, as well as having the advantage of allowing certain unwanted “off” flavors to dissipate.

The following guidelines will help you age your Mead properly:
- Try to keep your Mead as close to 60°F as possible and avoid high temperatures. Slight changes in temperature around the 60°F will not have a negative effect as long as they are gradual.

- Store the bottles on their side to keep the cork moist and prevent shrinking. This is not a concern if you are using beer bottles or artificial corks.

- Keep the Mead away from the light as this causes oxidation and “off” flavors.

- Avoid vibrations and shaking.

- If possible, bulk age your Mead rather than bottling and letting it age individually. Even though the Mead is all in one Carboy (or bucket), there may be very slight differences between the Mead at the top versus the Mead at the bottom. When you rack into bottles, each bottle may have a very slight difference that will age differently over time, so when you start to drink the Mead, changes in flavor or aroma may be noticed. By bulk aging, the Mead should all come out tasting the same, and once bottled, will result in very few differences.

The amount of time needed for the Mead to mature is subjective. Some people enjoy drinking it young, while others prefer to let it sit for many years. A rule of thumb seems to be that at least 1 to 2 years is fine. Sample the Mead every few months or so until you feel that it is at it’s best, then bottle and drink away.

Yeast autolysis: Once yeast have gone dormant and dropped into the lees, they begin to experience autolysis. This is the process where the cell’s own enzymes break down the cell walls, releasing the enzymes and other cellular structures into the Mead. These “guts” add a yeasty flavor, which is not always pleasant depending on the type of Mead being made. To avoid this, make sure as much of the yeast has been removed as possible by racking before aging.

OAK -

Oak is an easy to use and interesting “ingredient” that can add a great deal of complexity to a Mead. It adds various flavor compounds, such as vanillin, provides some astringency from Tannin, and colors the Mead a little. There are various choices when deciding on what type to use. These include the source of the oak (United States, France, Hungary, Croatia), the toasting level, and the format (cubes, staves, beans, or chips).

Source - The Hungarian Oak is the mildest, followed by the French and then the American Oak.

Toast Level - The lower the toast, the higher and more quickly the astringency is imparted into the mead. The higher the toast level, the more caramel, vanilla, chocolate and smokey characteristics are imparted.

Format: Cubes or beans are the best option as their uniform shape allows for greater consistency in the flavors they contribute.

2.5 to 3 ounces per 5 gallons is considered to be equivalent to “new barrel” extraction rates.

For cubes, the following weights are approximate:
· 1 ounce is 34 cubes
· 2 ounces is 68 cubes
· 3 ounces is 102 cubes

A mixture of different types of oak can be used to bring the desired characteristics to the Mead.

Oak is usually added in the secondary when fermentation has ceased. Rack off the lees as much as possible to avoid any yeast flavors which can interfere with tasting the oak. The oak must be washed to make sure there are no contaminants that could spoil the Mead. To do this, soak the oak in a solution of K-Metabisulfite, drain, then rinse with distilled water. A simple way to make using oak easier is to tie the oak up in a small piece of sanitized cheesecloth, weighted with a couple of marbles. This way, the racking will be far easier.

Leave the Mead to sit on the oak for 1½ to 2 months, then begin to sample the Mead every week or so. Once the desired level of oaking has been achieved, rack off of the oak into a clean vessel and leave to age. Note that wines that

are higher in alcohol will extract the oak flavor quicker since alcohol is a better solvent than water. High ABV wines, above 13% in this case, should be tasted sooner and more often or the Mead may be over oaked.

The NewBee Giude to Making Mead - Chapter 18: Bottling

Contributed by Angus
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Bottling is perhaps one of the most time consuming parts of the process of making Mead. There are many options for how you intend to bottle, some requiring a little more equipment, but none of them are particularly difficult. Examples of bottling options are:
- Wine, beer or plastic bottles.
- Capped or flip-top beer bottles (Note – do not use beer bottles that were made for screw off caps).
- Corked or screw-top wine bottles.
- Artificial or natural corks.
- Etc.

Depending on your style of Mead, the bottle option will change. If you are not someone who drinks a whole wine bottle in one sitting, then maybe the 12 oz. beer bottles are the best choice. If you intend to drink the Mead fairly quickly, then screw-top bottles may be the most convenient. Once you have decided what type of bottle you will use, following these guidelines will help reduce spoiling a batch or making “bottle bombs”.

1. About a week before you intend to bottle, rack the Mead one last time. This will remove the chances of the yeast lees being transferred into the bottles. It will also show you if the Mead is still active as fermentation may start back up again. It is at this point that chemicals such as Metabisulfites and Sorbates can be added to stop fermentation (see below for the instructions and use). If you are making a sparkling Mead, do not add any chemicals as this will prevent the fermentation of the priming sugar that creates carbonation.

2. Thoroughly sanitize all of the bottles, corks or caps, racking cane, tubing, and bottle filler.

3. Drain the bottles and line them up below the fermenter.

4. If you are making a sparkling Mead, rack it into a sanitized fermentation bucket with some priming sugar before you begin to bottle. Use ¾ cup of sugar per 5 gallons (2 ½ Tbs. Per gallon). Do not mix too vigorously as this may oxidize the Mead.

5. Proceed with siphoning the Mead, leaving enough head room in each bottle to account for the cork plus air. The easiest way to do this is to insert the tube or bottle filler all of the way to the bottom of the bottle, then fill the bottle to the very lip before stopping the flow. As you remove tube, the level of the Mead will drop just the right amount for the headroom. If too much headroom is left in the bottles, the corks will actually be pushed back out a bit when inserted.

6. If you have a way to blanket the Mead with CO2, do this before sealing the bottles. This will help reduce the oxygenation in the bottle.

7. Seal each bottle.

Store your bottles in a cool and dark location until you are ready to drink them.

Chemicals:

Potassium Metabisulfite or Sodium Metabisulfite. Potassium metabisulfite is added to wine to inhibit bacteria and yeast growth, as well as slow down oxidation. It may leave an unpleasant aftertaste in wine if the dose is too high. This chemical is also used in a water solution as an antiseptic rinse to sanitize equipment. It is identical to, but better than, Sodium Metabisulfite, because it does not add sodium to one’s diet. CAUTION: Some people, particularly asthmatics, can have a severe allergic reaction to this substance.

Use: For wine: 1/8 teaspoon (1 gram) of powder per gallon of wine provides 150 ppm free SO2. A little bit goes a long way, so be careful! Generally speaking, the target free SO2 for red wines is 20-30 ppm and 25-40 ppm for white wines. Potassium Sorbate (stabilizer). Potassium Sorbate prevents renewed fermentation in wine that is to be bottled and/or sweetened. Use ¼ to ½ teaspoon per gallon.

The NewBee Guide to Making Mead - Chapter 19: Troubleshooting and Common Questions

Contributed by Angus
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At some point during the process, something will either go wrong, or you will not know what to do next. In the immortal words of Douglas Adams “DON’T PANIC!” There are two ways of dealing with the situation. First, check the answers below; second, go to the forums.

One point to make about the forums. They are huge, which means that your question has almost certainly been asked and answered. Before you start a new topic, do some research by searching through the postings. You may find the answer you are looking for. The search button is easy to use and even if you do not find the exact answer, you will read a lot of great information that will make you a better brewer. Only then should you start a new topic.

“My fermentation is stuck. How do I restart it?” This is a tricky one as there can be many reasons why it has stopped, each requiring a different answer. The major things to check are as follows:

- Has it fermented to completion? In other words, you are done.

- Is the temperature too cold? Put it in a warmer area.

- Has your yeast reached its ABV limit? Get another one that can ferment higher.

- Did you start with too much honey (S.G. is too high)? Make a starter.

- Did it even start in the first place? Repitch new yeast, the first may have been bad.

- Did you use a juice with Sorbate? Check the answer below.

- What is the acid level in the Must? Adjust with acid or base additions.

- Etc., etc., etc.

The best thing to do at this point is to go and research the forums a little, then ask the experts.

“There is a funny Growth in the Mead. What next?” Funny looking things either floating on top of the Mead or sitting on the bottom are not always a cause for alarm. Some yeast like to bunch together (flocculate) and they can create some very odd looking growths. There are times when something else has found its way into the Mead though, and these can be very destructive. If you see something that does not look like it belongs, sample the Mead to see if the smell or flavor is “off”. If there is nothing that seems wrong to you, then it is probably just yeast or bits of fruit (if making a Melomel). If there is an odd flavor or smell, immediately rack the Mead into a clean carboy being as careful as possible not to disturb the growth. Some sulfites can be added to the racked Mead if the fermentation has ceased, which will hopefully prevent any of the unwanted organism from growing again.

“The Mead has a strange smell” This is a difficult one to answer since defining what a strange smell is can be very subjective. To the inexperienced brewer, the smells given off during fermentation can seem strange. If the smell is particularly pungent though, then there may be something wrong. In a situation like this, there is not much that can be done since whatever is causing the smell is already at work in the Mead. Things to try are to rack the Mead into a clean carboy (see the answer for Growths above), to throw in some sulfites to stop anything from growing (as long as fermentation has reached a point that you are happy with), putting the fermenter in a cooler area (temperatures above the yeast’s range can cause them to produce unwanted esters), or just leaving it and hoping for the best.

“How do I get the Mead to clear?” The first thing to do, if you can, is to cold crash the Mead. This means putting it into a cold environment (around 38ºF) for a week. This usually drops it clear. If this does not work, or you cannot do this, then the next easiest thing to do is to use a Fining agent such as Polyclar, Bentonite, or Sparkolloid. Rack off of the Lees and let the Mead settle for a few weeks after clearing to make sure everything drops out before bottling. If each of these still fail, including a combination of them, then you can purchase a filter system and use a 0.5 micron filter to scrub all matter out of the Mead.

“I used Juice with Preservatives. What now?” Using a juice that has been dosed with Sorbate or some other preservative will prevent your yeast from growing and fermenting. Chances are, you are stuck. The batch may be saved though, so do not despair. Check the forum for topics on juices with preservatives, which is full of suggestions for starting the fermentation

“How much space is too much in the top of the carboy?” Depends on what stage it is in. You want to make sure that there is sufficient space above the fermenting Mead to allow the Krausen to grow. This is particularly important when using fruit, as the pulp can get pushed up into the airlock and you have a messy spill. Once fermentation has completed, then you want as little space as possible to avoid oxidation. If you have more than 3 inches, try to rack into a smaller container, although it is not entirely necessary as long as you make sure that the Mead is blanketed in CO_2, no matter how large the headspace is.

“Can I top the Mead of using extra Must?” Yes. When you mix your Must, it is possible to transfer some to a sanitized jug before adding the yeast. This jug should be stored in a fridge, or frozen, until needed to help preserve it. If you need to top your Mead off when you have racked it, you can then gently pour the reserved Must in, avoiding any splashing which will add unwanted oxygen.

“Is my fermentation temp too hi/low?” Check the temperature limits of the yeast you are using. If the area you are fermenting in falls outside of these limits, then you should make some changes. If it is too cold, move it to a warmer location, or wrap a warming blanket around it (beware not to get it to hot). If it is too warm, move it to a cooler location, or wrap some wet towels around it to help cool it off.

“How do you back sweeten?” Once all fermentation has ceased, you may find that the Mead is too dry for your liking and you want to make it sweeter. To do this, you first need to make sure that the yeast are either all gone, or will not restart when you add the honey. Either use a filter, try the clearing methods described above, or dose the Mead with sulfites. Then, take a measured sample of the Mead, a cup should be about right, and slowly start to stir in the honey a little bit at a time, until you reach the desired sweetness. Calculate how much Mead you have, and multiply the amount of honey to reach the same sweetness for the full batch. Carefully stir it in to avoid oxidation, then let it sit for a couple of months to make sure fermentation has not restarted.

“Can I use cheap honey?” Of course, but remember that your end product is only as good as the ingredients you use. Start with cheaper honey while you learn, then begin using some better, unprocessed varietals to add more character to your Mead.

“How can you tell if it is still fermenting?” First, see if there is any activity in the airlock. Very slow changes in the water level can be caused by temperature swings, so do not rely totally on this. The best method is to take gravity readings a couple of weeks to a month apart. If they do not change over this period of time, then the fermentation is probably complete.

“If the recipe is for 1 gallon, do you just multiply everything by 5 to make 5 gallons?” For the most part, yes. In the case of the yeast, you do not usually need to increase the amount pitched by 5. The small packet of yeast is sufficient to ferment 1 gallon up to 5 gallons, although using two packets will help start things off better. Also, the amount of time spent aerating will remain the same no matter what size batch you are making.

“Should I use chemicals to stop fermentation or not?” This one is up to you. Many people prefer not to use any chemicals, particularly since some people are allergic to them. If you are afraid that you might be making bottle bombs (bottles pressurized by continued fermentation that can explode - VERY DANGEROUS), then use them. Otherwise, you can filter with a 0.5 micron filter, cold crash, or just wait a very long time.

“When should I rack?” Racking is dependant on what is happening to your Mead, and what you intend to achieve. Racking is usually done to slow fermentation, to get the Mead off the Lees, to remove the Mead from other ingredients, to clarify, etc. You must therefore determine when you should rack by how the Mead looks and tastes.

“How long should it be aged?” That is up to the individual brewer. Some Meads, particularly the sweeter ones, seem to age quicker and can be enjoyed sooner than dryer ones. But, the amount of time the Mead is left to age depends on how it tastes at any given time. The average length of time Mead is aged tends to be around 1 year, although the longer it is left, the better it usually gets. Be patient, sample it every now and then, and drink it when you think it is ready. Try to keep a few bottles for long-term aging to see how good it can get.

“Can I distill the Mead?” Yes, but do not ask GotMead for help. This is a Mead site, and we do not discuss distillation. To do this, you must have a license and pay taxes, so it is not something the forum will get involved in.

“Can I reuse yeast from a previous batch?” Yes, but it is not really advisable. All yeast, no matter how well they have been treated, are stressed a little during the fermentation process and can mutate slightly. This will lead to them possibly producing esters or other compounds that can make your Mead taste funny. Since yeast are usually very cheap, particularly the dried types, it is better to start fresh every batch.

The NewBee Guide to Making Mead - Chapter 20: What Next?

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The basic process of how to make a Mead has now been covered, and you are probably asking yourself what the next step is. The simple answer is to keep learning. The GotMead forum has a wealth of information a large group of people who are more than happy to help. It is also a very good idea to pick up a copy of Ken Schramm’s book, The Compleat Meadmaker. Ken is an extremely experienced Mead maker, and his book is packed full of useful information, both historical and practical.

Finally, remember that practice makes perfect, so do not be disheartened if your first batch (or batches) are not exactly what you are looking for. Keep trying, and use your imagination to create what you are looking for in a Mead. If it does not work, you will most likely have created something pleasant to drink anyway, so no real loss. And if you dream up some bizarre combination of ingredients that you are unsure whether they will work well together, remember Pete’s unofficial GotMead motto: “Take a chance. Custer did!”

The NewBee Guide to Making Mead - Appendix 1: Honey Varietals

Contributed by Angus
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Honey Varietals
Acacia - Light and delicate, with a flavor that reminds us of dried pineapple.

Alfalfa - Still more delicate. It does not taste like clove or allspice, and yet there is a subtle similarity of -- character?

Avocado - Dark and rich and full-bodied, and there is definitely a "family resemblance" to the avocado fruit! A very sensuous honey.

Basswood - This is one where the language of flavors is simply inadequate. Basswood is sharper than some; complex and interesting; possibly woody? We like it for tea --Earl Grey, say.

Bits & All - A very sweet, lighter wildflower (mostly clover) with none of the wax fragments, scraps of propolis or bee bits filtered out. This'n's got texture!

Blackberry - Medium light and exceptionally sweet! Popular with kids. It has a fruity character.

Blueberry - Midrange in color, blueberry is surprisingly rich-tasting. The "blueberry" note is, to me, faint to nonexistent, but visitors to Castlemark's booths have remarked on it with some enthusiasm.

Buckwheat - "Single-malt honey." The very strongest and darkest of honeys, it approaches blackstrap molasses (in my opinion). This is one that is much more than just a pretty sweetener, but will hold its own in whatever you want to cook!.

Christmas Berry - The taste is strong and exotic. It is of medium body and if I could come up with THE word, it would be exactly that word. As it is, it's not light or heavy, nutty or fruity, etc.

Clary Sage - Medium in strength and color, it is quite distinctive in its complex (read: "how do I describe *this* one???") flavor. One of Castlemark's gourmet customers proclaimed that it was "just what [he] expected of clary." I'll take his word for it. Like basswood, it makes a nice partner for tea when you want more than the tea flavor alone.

Clover - Just because it's familiar doesn't mean it can't be wonderful. One of the delicate, sweet ones; if a child's ever picked you a bouquet of clover, you know the fragrance of this one. It's our Meadmaking friend and Fergus's personal favorite.

Cotton - A bit on the dark side of medium, it is sooo smooth and rich and mellow. It's shaping up to be one of Castlemark's bestsellers

Cranberry - An exciting honey. It is medium sweet and the taste is tangy

Desert Sage - Light, with just a bit of edge to its character, and a pleasant dustiness

Echinacea - Unexpected! Medium-dark, it makes me think of a chewy granola bar (with coconut?) Should be good in cookies. I'll let you know

Eucalyptus - Yes, it does have a hint of that cool eucalyptus quality, sometimes a little more, sometimes barely there, in a pleasant mellow honey

Fireweed - *The* most popular! It has an extraordinary buttery taste -- if you like your toast or biscuit with butter and honey, you can leave off the butter (and save all those fat grams!)

Foxglove - Another complex, hard-to-describe one, it's our elder daughter's current favorite. Medium-dark, edgy, flavorful -- try it and write us what you think of it.

Goldenrod - "Golden" is a good name for this one. Well-rounded, not too sweet, it's the perfect "Winnie-the-Pooh" honey. Well -- that's what I said till I tasted Vetch. *That* tastes like perfect Winnie-the-Pooh honey, and it's nothing like goldenrod!

Heather - Though a lighter-than-medium gold color, it is one of the very strongest flavors -- and not to everyone's liking. It is fragrant and floral with a very lingering aftertaste that is almost bitter, the way hops is bitter. Castlemark recently made an amber ale and added heather honey: Celtic heaven!

Holly - A very pleasant honey. Medium sweet with some nutty overtones. Fun. The kids describe it as having the taste of candycorn.

Lehua - From Hawai'i, it's middlin' gold and middlin' sweet and just plain weird in flavor. Anyone want to offer a better description? "Almost salty "-- Virginia Renaissance Faire patron

Linden - Looking for linden? Basswood is called "the American linden," and European visitors who sample it at Castlemark's Renaissance faire booth seem to agree. See above.

Macadamia - Another one from Hawai'i, yes it will remind you of the nut -- a "family resemblance" again. And it's almost as weird as lehua. Very rich-tasting, and amber in color.

Meadowfoam - Tastes like the inside of a warm marshmallow. Really!

Mesquite - Light, delicate, and it does taste like "mesquite" -- not smoky, but if you can taste the difference between mesquite-smoke and hickory-smoke, you'll have an idea what to expect of the honey.

Orange Blossom - A singularly beautiful honey, the taste of an orange grove in full bloom, light, heady and fragrant!

Palmetto - In a class with avocado and blueberry: somewhat strong, rich and mellow, and dark amber in color.

Raspberry - This is a delightful honey. It is light with a slightly fruity taste. Silky to the feel.

Snowberry - Light, sweet, with a bit of tang; not as "thick" as some

Sourwood - The prize of the Carolinas and Tennessee, this light-colored, delicate, subtle honey is becoming hard to come by, as stands of sourwoods are falling to developers. Not sour, but less sweet than some.

Thistle - Light in color and "lively" in flavor. Fun and popular!

Tulip Poplar - Second only to buckwheat in strength and darkness of color, and sweeter. Interesting, woody -- and makes an intense, dark mead!

Tupelo - Famed in song, one of the very sweetest honeys. Clear yellow in color, with a characteristic greenish glow.

Vetch - Above, I said goldenrod was Winnie-the-Pooh honey. Maybe vetch is, instead

Wildflower - This is what they call it when they weren't paying attention to where the bees were going. Expect wildflower to vary from season to season, and region to region.

The NewBee Guide to making Mead - Appendix 2: Types of Mead

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FYI" The following is provided solely as interesting information and is not required reading to make your Mead. Different cultures and civilizations all over the world have made and drunk Mead for thousands of years, each one giving it a different name. Forest Scott, owner of the Mead Maker's Page, has collected the following names of Mead and honey in various countries:

· Aguamiel - Spanish mead
· Balche - Mayan mind altering mead made with balche bark
· Chouchen - Breton (France) mead
· Hidromel - Portuguese mead
· Hydromel - French mead
· Idromele - Italian mead
· Med - Bulgarian and Ukranian
· Meddeglyn or myddyglyn - Welsh spiced mead
· Mede - Dutch mead
· Medovina - Czech and Slovak mead
· Medovukha - Russian mead
· Medu - Ancient? German mead
· Medus - Lithuanian and/or Latvian honey
· Meis - Eritrean mead
· Meodu - Old English word for mead
· Met - German mead
· Midus - Lithuanian mead
· Miòd - Polish mead
· Mjød - Danish and Norwegian mead
· Mjöd - Swedish mead
· Mõdu - Estonian honey beer
· Nabidh - Arabic mead
· Sima - Finnish mead
· T'ej - Ethiopian mead (since about 400 B.C.)
· Ydromeli - Greek mead Honey Around the World:
· Ngarlu - Australian Aboriginal
· Tapli - Georgian (in the Caucasus)
· Mel - Welsh, Brazilian, (and others)
· Hunaja - Finnish
· Honig - German
· Honning - Norwegian
· Honung - Swedish
· Mjod - Russian
· Miel – Spanish
· Hatchi Mitzu - JapanHere are some other names for mead that Vicky found in her researches:
· Madhu - in the Sanscrit Vedas
· Nectar or Ambrosia - in the Greek and Roman mythologies these were thought to have been possibly referring to mead, as honey was considered a 'food of the gods'
· Alu - Prussian for mead
· Methe - Ancient Greek for mead
· Mede - Frisian, and Low German
· Metu or Mitu - Old High German
· Meth - German
· Melikatos - old Greek (morphed into hydromeli in present)

The NewBee Guide to Making Mead - Appendix 3: Additional Equipment

Contributed by Angus
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The following pieces of equipment are useful, although not necessary:

Yeast Starter Bottle We should first make note that there is a difference between a “yeast starter" and “rehydrated” yeast. If you are following the instructions on the dry yeast packet, you will be rehydrating your yeast with nothing more than slightly warmed water approximately 15 minutes before pitching. A “yeast starter” involves adding your rehydrated yeast to a small solution containing nutrients, energizers, and food (some of the Must is an excellent choice), and letting it start to reproduce.

There are two main advantages to doing this:
- The yeast will become acclimated to the conditions they will soon be poured into (i.e. acidity, sugar content, nutrient level), which will prevent potential shock that could stall your fermentation.
- The numbers of the yeast will be such that they will completely overwhelm any other bacteria or yeast that have found their way into your Must.

Any container that can be sanitized can be used for rehydration, but having a container that can have an airlock attached is a good idea for the starter since you do not want to cultivate unwanted yeast. Glass or plastic is best, but metal is fine as long as it is not aluminum (see above).

Scum Skimmer: If you are using raw and unprocessed honey and you are boiling or pasteurizing it, a fair amount of scum will rise to the top that needs to be removed. This scum is made of wax, proteins, bee parts, pollen etc. that will do little for the Mead at this point. A Tea Strainer works well for this as the mesh is small enough to grab all of the scum, but will still let the precious Must through. If scum continues to rise to the top of the Must during fermentation, you should continue to use the strainer to remove it, making sure to sanitize it properly before each use.

Measuring Spoons: Needed to measure out the nutrients, energizer, spices, and anything else you plan on adding to the Must.

Funnel: If you intend to ferment everything in jugs or Carboys, then this is a necessity. Pouring any liquid into the neck of a Carboy is hard enough as it is, but it can also be hazardous if the Must is hot. Any funnel will do, but it must be able to handle the heat of a freshly boiled Must without warping. Some funnels available from Homebrew stores come with filters, allowing you to remove unwanted ingredients as you pour it.

Bottle Washer - A bottle washer is a device that shoots water into the bottles and helps flush the gunk out. One type is a simple brass gizmo that screws onto the faucet and shoots a high-pressure spray of water when the bottle is pushed onto it. Another type that mounts on top of a bottle drying tree includes a reservoir that allows a cleaning fluid to be added to the water to aid in sanitation. From my experience, the brass model works tremendously well.

Blow-off Tube: Very active fermentations sometimes result in Mead and foam being pushed up through the Airlock, resulting in a mess. To avoid this, a simple device can be made that allows any blow-off to be directed into a container while preventing any air from entering the fermenter. All that is needed is a stopper with a hole large enough for a siphon tube to be inserted, a 3 foot length of siphon tube, a small bowl, and some sanitation fluid. Push the siphon tube into the stopper hole and insert the stopper into the fermenter. Pour the sanitation liquid into the bowl, and put the other end of the hose into the liquid so that the end is held under the surface.

Aeration Stone and O2 Bottle: The yeast need to have a good amount of oxygen early in the fermentation process. This can be achieved by either shaking the mead vigorously, by stirring it rapidly, or by aerating it using a stainless steel aeration stone and an oxygen bottle. The stone is very easy to use and introduces sufficient oxygen into the Must in just a couple of minutes.

Testing Equipment - Acid testing kits, Brix Refractometers, and other laboratory equipment can be helpful in the brewing process, particularly when something goes wrong and you are trying to find out what to do differently next time. For example, acid levels are sometimes high enough that the fermentation does not start or it stalls part way. If you can measure the pH of the Must at the beginning, you may spot this and make some ingredient adjustments to raise the pH. None of the testing equipment is absolutely necessary, particularly for a beginner. Vicky – “Mainly, I go with my instinct, and my taste buds”

The NewBee Guide to making Mead - Appendix 4: Food Grade Plastic

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Plastic containers are made from different polymers, the combination of which results in a product that is or is not of food grade quality, as defined by the U.S. Food & Drug Administration (FDA). All plastic containers used to store food must be of food grade quality (pharmaceuticals are stored in containers with even higher requirements), and may not have any dyes or recycled plastics that have been determined to be harmful to humans. The type of plastic must also be suitable for the application since foods that are highly acidic, or that contain alcohol or fats, can leach plastic additives from the packaging or container into the food. Finally, any plastic container that is made of food grade plastic but has been used to store non-food items, in particular chemicals or detergents, is no longer considered food grade.

Note that not all HDPE plastic is of food grade quality. Check that it is marked “Food Grade” before purchasing it. If you cannot confirm that the plastic used is food grade, then assume it is not and look for something else.

Other types of plastic containers to avoid: Garbage cans, Mop buckets, Laundry detergent or kitty litter buckets, Dry pet food buckets 5-gallon utility buckets from the home center Household storage containers Garbage bags

In the United States, the following codes, known as the Resin Identification Codes, are stamped on all containers used for food. They identify the seven categories of plastic used in nearly all plastic containers and product packaging: PET or PETE (polyethylene terephthalate) is a clear, tough polymer with exceptional gas and moisture barrier properties. PET's ability to contain carbon dioxide (carbonation) makes it ideal for use in soft drink bottles.

Examples: Soft drink bottles, detergent bottles
HDPE (high density polyethylene) is used in milk, juice and water containers in order to take advantage of its excellent protective barrier properties. Its chemical resistance properties also make it well suited for items such as containers for household chemicals and detergents. Most five gallon food buckets are made from HDPE.

Examples: Milk bottles, shopping bags
Vinyl (polyvinyl chloride, or PVC) provides excellent clarity, puncture resistance and cling. As a film, vinyl can breathe just the right amount, making it ideal for packaging fresh meats that require oxygen to ensure a bright red surface while maintaining an acceptable shelf life.

Examples: Plastic food wrap, shrink wrap, garden hoses, shoe soles
LDPE (low density polyethylene) offers clarity and flexibility. It is used to make bottles that require flexibility. To take advantage of its strength and toughness in film form, it is used to produce grocery bags and garbage bags, shrink and stretch film, and coating for milk cartons.

Examples: Squeeze bottles, dry cleaning bags
PP (polypropylene) has high tensile strength, making it ideal for use in caps and lids that have to hold tightly on to threaded openings. Because of its high melting point, polypropylene can be hot-filled with products designed to cool in bottles, including ketchup and syrup. It is also used for products that need to be incubated, such as yogurt. Many Cambo, Tupperware and Rubbermaid food storage containers are made from PP.

Examples: Bottle caps, take-out food containers, drinking straws
PS (polystyrene), in its crystalline form, is a colorless plastic that can be clear and hard. It can also be foamed to provide exceptional insulation properties. Foamed or expanded polystyrene (EPS) is used for products such as meat trays, egg cartons and coffee cups. It is also used for packaging and protecting appliances, electronics and other sensitive products.

Examples: Plastic foam, packing peanuts, coat hangers
Other denotes plastics made from other types of resin or from several resins mixed together. These usually cannot be recycled. Removing Odors And Stains From HDPE Buckets Since HDPE buckets are somewhat porous, they can hold odors and stains from foods like pickles or barbecue sauce. In this case, you can attempt to remove the odor, but the chances are good that some will remain, which will leech into your Mead and make for some pretty nasty off-flavors. If the odor is mild, you can try the following to see if the container can be used:Wash the bucket inside and out with warm, soapy water, then rinse.Pour 1 cup of baking soda into the bucket and fill with warm water all the way to the top. Stir to dissolve and let it sit for a couple of days in a warm location.Empty the bucket, then pour in 1 cup of bleach and fill with warm water all the way to the top. Stir to mix, then let it sit for a couple of days in a warm location.

Rinse thoroughly multiple times, replace the lid and let it sit for a few days. Carefully remove the lid and take a whiff. If you can still smell the remnants of what was in there, the bucket is probably of no use as a fermenter.

The NewBee Giude to Making Mead - Appendix 5: Instructions for Using the Mead Calculator

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The following are instructions for using the calculator created by JamesP.

To calculate the SG of a batch based on amount of ingredients and batch size:

Step 1: Select Metric, US, or Imperial (option is preset to US)

Step 2: Check Target Volume box, and enter the batch size (e.g. 5.0 US Gal, 15 Litres)

Step 3: Check Additional Sugars #1 box, and enter the type and amount of fermentable.

Step 4: Continue to check the additional ingredients that are being used, if any, and enter their amounts.

Step 5: Make sure the Target Gravity and Current Gravity boxes are not checked.

Step 6: Hit the Calculate button. The result given will be the potential SG and %ABV of the Must based on the amount of fermentables you will be using. To make small adjustments, simply change the values in the Sugars boxes, and hit Calculate again. By doing this, it is possible to tweak the amounts being used to hit a specific SG. Notes: If you are going to be heating your Must, you can adjust the temperature of the calculator to account for the higher temps. You can adjust the sugar content of the ingredients if you know that they are not as entered automatically by the calculator. Juices have the same sugar content as the whole fruit. Just change the amount to the liquid measurement rather than weight. Example: The screenshot below shows the calculations for a 5 Gallon batch with 15 lbs of honey.

To calculate the amount of honey needed to reach a specific SG:

Step 1: Select Metric, US, or Imperial (option is preset to US)

Step 2: Check Target Volume box, and enter the batch size (e.g. 5.0 US Gal, 15 Litres)

Step 3: Make sure the Additional Sugars #1 box is not checked.

Step 4: Check the Target Gravity box.

Step 5: Enter the SG you are aiming for.

Step 6: Hit the Calculate button.

Step 7: To add other fermentables, such as fruit or sugar, check the Additional Sugars #2, #3, and #4 boxes as needed, and enter the amounts. Make sure to leave the Additional Sugars #1 box unchecked.

This time, the quantity under Additional Sugars #1 will change to give the amount of honey needed to meet your goal. You can change the type of fermentable and the amount needed will change as well. You can also add other ingredients that will contribute to the overall sugar, and the amount of honey needed will adjust.

Example: The screenshot below shows a 5 Gallon Cyser (4 gallons of apple juice is used instead of water). The goal was to hit around a 17% ABV, which is an SG of 1.125. This goal SG was entered into the Target Gravity box. The calculator returned a value of 13.3 Lbs of honey needed to bring the SG up to our goal SG.

The screenshot below shows the exact same example, but this time with a straight Mead instead of a Cyser, so the Apple juice has been removed (water will be used instead). Note that the amount of honey needed to hit the goal SG has therefore increased to 17.162 Lbs.

To calculate the amount of extra fermentables needed to increase the SG to a goal gravity:

Step 1: Select Metric, US, or Imperial (option is preset to US)

Step 2: Check Target Volume box, and enter the batch size (e.g. 5.0 US Gal, 15 Litres)

Step 3: Check the Current Gravity box and enter the current gravity of the Must.

Step 4: Make sure the Additional Sugars #1 box is not checked.

Step 5: Check the Target Gravity box.

Step 6: Enter the SG you are aiming for.

Step 7: Hit the Calculate button.

Example: The screenshot below shows a 5 gallon batch that is currently at an SG of 1.100. The goal is to reach an SG of 1.125. The calculator returns a value of 3.432 Lbs. of honey needed.

THE NEWBEE GUIDE TO MAKING MEAD - APPENDIX 6: ABV/BRIX/S.G. CHARTS

Written by Angus
Sunday, 07 June 2009

SG	**Gravity**	**Brix**	**Baumé**	**Honey(lb&oz/US gal.)**		**P-ABV (%)**
(degrees)	(degrees)	((SG-1) ×220)+1.6	lb	oz	0.6Br-1	
1.000	0	1.6	0.0	0	0	0.0
1.005	5	2.7	0.7	0	2.2	0.6
1.010	10	3.8	1.4	0	4.4	1.3
1.015	15	4.9	2.1	0	6.6	1.9
1.020	20	6.0	2.8	0	8.7	2.6
1.025	25	7.1	3.5	0	10.9	3.3
1.030	30	8.2	4.2	0	13.1	3.9
1.035	35	9.3	4.9	0	15.3	4.6
1.040	40	10.4	5.6	1	1.5	5.2
1.045	45	11.5	6.2	1	3.7	5.9
1.050	50	12.6	6.9	1	5.9	6.6
1.055	55	13.7	7.5	1	8.0	7.2
1.060	60	14.8	8.2	1	10.2	7.9
1.065	65	15.9	8.8	1	12.4	8.5
1.070	70	17.0	9.4	1	14.6	9.2
1.075	75	18.1	10.1	2	0.8	9.9
1.080	80	19.2	10.7	2	3.0	10.5
1.085	85	20.3	11.3	2	5.2	11.2
1.090	90	21.4	11.9	2	7.3	11.8
1.095	95	22.5	12.5	2	9.5	12.5
1.100	100	23.6	13.1	2	11.7	13.2
1.105	105	24.7	13.7	2	13.9	13.8
1.110	110	25.8	14.3	3	0.1	14.5
1.115	115	26.9	14.9	3	2.3	15.1
1.120	120	28.0	15.5	3	4.5	15.8
1.125	125	29.1	16.0	3	6.6	16.5
1.130	130	30.2	16.6	3	8.8	17.1
1.135	135	31.3	17.1	3	11.0	17.8
1.140	140	32.4	17.7	3	13.2	18.4
1.145	145	33.5	18.3	3	15.4	19.1
1.150	150	34.6	18.8	4	1.6	19.8
1.155	155	35.7	19.4	4	3.8	20.4
1.160	160	36.8	19.9	4	5.9	21.1

THE NEWBEE GUIDE TO MAKING MEAD - APPENDIX 7: CONVERSION TABLES

Written by Angus

Liquid Metric	Imperial	US Cups	US Pints
30ml	1 fl.oz.	1/8th	
60ml	2 fl.oz	1/4	
90ml	3 fl.oz.		
120ml	4 fl.oz.	1/2	1/4
150ml	5 fl.oz		
180ml	6 fl.oz	3/4	
210ml	7 fl.oz.		
240 ml	8 fl.oz.	1	1/2
270ml	9fl.oz.		
300ml	10fl.oz	1 1/4	
330ml	11 fl.oz.		
360ml	12 fl.oz.	1 1/2	3/4
390ml	13fl.oz.		
420ml	14 fl.oz.	1 3/4	
450ml	15 fl.oz.		
480ml	16 fl.oz.	2	1
600ml	20 fl.oz.	2 1/2	
960ml	32fl.oz.	4	1 quart
1.1 L	40 fl.oz.	5	2 1/2

Weight Metric	Imperial
25g	1 oz
50g	2 oz
75g	3 oz
100g	4 oz = 1/4lb
125g	-5 oz
150g	+5 oz
175g	6 oz
200g	7 oz
225g	8 oz = 1/2lb
250g	9 oz
275g	10 oz
300g	11 oz
325g	- 12 oz = 3/4lb
350g	+12 oz
375g	13 oz
400g	14 oz
425g	15 oz
450g	16 oz = 1lb
675g	22 oz = 1 1/2lb
1kg	2.2lb
1.2kg	2 1/2lb
1.3kg	3lb
1.8kg	4lb
2.2kg	5lb

Sunday, 07 June 2009

0

U.S. to Metric
Capacity
1/5 teaspoon = 1 ml
1 teaspoon = 5 ml
1 tablespoon = 15 ml
1 fluid oz. = 30 ml
1/5 cup = 50 ml
1 cup = 240 ml
2 cups (1 pint) = 470 ml
4 cups (1 quart) = .95 liter
4 quarts (1 gal.) = 3.8 liters

Weight
1 oz. = 28 grams
1 pound = 454 grams

Metric to U.S.
Capacity
1 militers = 1/5 teaspoon
5 ml = 1 teaspoon
15 ml = 1 tablespoon
30 ml = 1 fluid oz.
100 ml = 3.4 fluid oz.
240 ml = 1 cup
1 liter = 34 fluid oz.
1 liter = 4.2 cups
1 liter = 2.1 pints
1 liter = 1.06 quarts
1 liter = .26 gallon

Cooking Equivalents
16 tbs = 1 cup
12 tbs = 3/4 cup
10 tbs + 2 tsp = 2/3 cup
8 tbs = 1/2 cup
6 tbs = 3/8 cup
5 tbs + 1 tsp = 1/3 cup
4 tbs = 1/4 cup
2 tbs = 1/8 cup
2 tbs + 2 tsp = 1/6 cup
1 tbs= 1/16 cup
2 cups = 1 pint
2 pints = 1 quart
3 tsp = 1 tbs
48 tsp = 1 cup

The NewBee Guide to Making Mead - Appendix 8: Sample Recipe

Contributed by Angus
Sunday, 07 June 2009
Last Updated Tuesday, 23 June 2009

The following recipe is from “The Complete Joy of Home Brewing”. The notes are basic, but point to what is needed to reproduce or improve on the recipe.

Antipodal Mead

Brew Date: 08/19/05
Batch Size: 5 gal.Honey Varietal & Clover
S.G. goal: 1.100%ABV
goal : ; 15%
Notes: The yeast can ferment this one dry

Recipe:
15 lbs Honey (Grade A clover)
1 tsp Yeast nutrient
1 Tbs Acid Blend
1 tsp Irish Moss
0.5 tsp Gypsum
Water to 5 Gallons
Packet Pasteur Champagne Yeast

8/19/05

Heated tap water to 160ºF for 20 minutes; removed from heat. Added all ingredients and stirred well to mix honey. Cleaned 5 g carboy using water and 0.5 cup bleach. Let sit for 15 minutes, rinsed well with hot water and poured in must. Shook for less than a minute.
When cooled to 80 F, rehydrated yeast according to instructions and pitched.

S.G. = 1.102

Average brew temp = 68 F

8/20/05: Bubbling about 1 every 5 mins. Very slow!

8/22/05: Bubbling 1 every 2 seconds.

8/24/05: Posted question concerning speed and received comments from Oskaar. A must read. Future changes: Do not use Irish Moss or Gypsum in must. Use bucket for primary fermentation and aerate A LOT more.

9/14/05

s.g. = 1.010
ABV = 12.26%
Taste is still sweet, but nice honey flavor. Some other flavors in there, none of which are unpleasant. Alcohol is not burning, but pleasantly warm down the throat. Would like it to be a little dryer, so will continue fermenting .Racked into 5 g carboy. Volume loss brings it down to just over 4.5 g. Concerned with oxidation so blanketed with CO2. Next 5 g batch I make, I will be sure to prepare some extra Must to save for top-ups.
(Must get hold of the siphon pump to make this process easier)

8/25/06 F.G. = 1.010 This did not ferment any more. It probably stalled because of the lack of oxygen in the first 3 days, or because the acidity was too high. It actually tastes nice with the little bit of sweetness, so it came out good.

Bottled the Mead into 18 bottles. It is sweet and the honey tastes really nice.

THE NEWBEE GUIDE TO MAKING MEAD - APPENDIX 9: HOW TO READ A HYDROMETER

Written by Angus
Sunday, 07 June 2009

The following steps will make it easier to get the gravity readings using a hydrometer:

1. Take a sample of the Mead using a sanitized wine thief or turkey baster.
2. Try to put it into the hydrometer's measuring tube as carefully as possible to avoid creating Bubbles
3. Gently lower the hydrometer into the liquid, again to avoid bubbles from sticking to the base of the bulb as this will affect the reading.
4. Check to make sure it is not touching the sides of the tube.
5. Record the value on the scale at the bottom of the curved meniscus (the surface of the liquid).

See the diagram below for reference. In the case of the diagram, the reading is 1.070.