



Moonshining Guide

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Dangers, Alcohol flammability:

Alcohol is extremely flammable and in its vapor form it can be explosive. Care, vigilance and attention to detail should be practiced at all times during distillation and handling of any refined alcoholic products. Although distillation can be practiced indoors, it is not advisable to do so unless you are experienced. Also, distillation should never be done with an open flame heat source while distilling indoors or other confined spaces. Do not smoke while distilling. Do not drink while distilling. Do not leave a still unattended while distilling. Never block the outlet of the still.

Methanol toxicity:

Methanol is a toxin that is created as a byproduct of fermentation, but in such small amounts that you typically do not need to remove it. However, it is common practice to do it as a precaution and to improve the taste of your product. Since methanol boils at 144°F (62°C), it will boil first when you are distilling. Because of this you should discard the first 2 ounces of alcohol per every 5 gallons of mash (1 ounce for 2.5 gallons, 4 ounces for 10 gallons, etc.). Later in this guide we will remind you to throw away the foreshots at the appropriate time.

Distilling, First time use:

When using a new still for the first time, you must clean your still in a more thorough manner than through normal use. The procedure starts with washing all parts of the still very thoroughly with hot-soapy water. Filling and draining each piece multiple times is often necessary to remove the byproducts of manufacturing. The second step is called a vinegar run. Simply mix equal parts vinegar and water to roughly one-fifth the capacity of the still (i.e. a 1-gallon mix for a 5-gallon still.) Setup the still and condenser (without water), pour in the mixture, and heat until water/vinegar liquid and steam come out of the condenser. If the liquid that comes out of the condenser is not completely clear, you will need to repeat this step again. Turn off the heat, allow it to cool and dispose of the contents.

NOTE: There are several things that will cause discoloration and off-tastes. They are residual flux from soldering/welding, oxidation of copper and sharpie marks from marking up sheet copper for cutting. All are certified non-toxic, but obviously should be removed before making a drinking batch. The initial cleaning step should be taken seriously so you do not waste more than one run.

Purpose

The art of moonshining is just that, an art. There are a million-and-one ways to do it and most all of them are correct. The amount of information available on the subject is large and confusing enough to immediately crush the spirit of a new distiller before they ever take one step forward. The purpose of this guide is to help a complete novice moonshiner successfully make their first batch of moonshine - start to finish. However, learning should not stop here. Whether it is whiskey, rum, vodka or gin, there are many great people, resources and books available that are full of great information on whatever pursuit you have in mind.

Overview

The principal of fermentation:

Whether you're making beer, wine or moonshine, the fundamentals of creating alcohol from scratch are the same. Simply speaking, there are only three ingredients: water, sugar and yeast. Yeast is a microorganism that lives in water and eats sugar. Its byproduct (waste) is carbon dioxide and alcohol.

The principal of distillation:

Once you have a solution of water and alcohol, you need to separate them. Distillation accomplishes this by taking advantage of the different boiling points of water (212°F/100°C) and alcohol (173°F/78°C). If the temperature of a water-alcohol mixture is raised to 174°F (79°C) the alcohol should begin to boil off, but the water should still be too cool to boil. You can then capture the alcohol vapor, cool it down, and be left with liquid alcohol.

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Foreshots, heads, hearts, & tails:

Because the various alcohols and chemical compounds in a wash separate at different boiling temperatures, there are several phases of each distillation run: foreshots, heads, hearts, and tails. During the different phases of a run, taste and smell may vary considerably. Generally, only the "hearts" portion is kept for drinking. The heads and tails are set aside to be distilled again in the future. Of the liquid collected during a run, roughly 30% will be heads, 40% will be hearts, and 30% will be tails.

Foreshots are the very first vapors to boil off during a distillation run. This portion contains the toxin Methanol, which is poisonous and should not be consumed. Always discard the foreshots: approximately the first 2 ounces of alcohol per every 5 gallons of mash (1 ounce for 2.5 gallons, 4 ounces for 10 gallons, etc.). The heads contain lighter compounds that not only taste harsh and smell bad, but can give you a bad hangover if consumed. Set the heads aside to use in future spirit runs. The hearts primarily contain ethanol and the most desirable congeners. Hearts are rich in flavor, smell great, and taste quite smooth. This is the good stuff! Set this portion of the run aside for drinking. As hearts give way to tails, sweetness disappears, rich congener flavors dull, and the overall taste becomes bitter. Set this portion aside with the heads for future runs.

Cuts can have a dramatic impact on the final product. An experienced distiller knows when to make a "cut" from the heads to the hearts and also from the hearts to the tails. In distilling a "cut" is when you stop collecting in one jar and start collecting in a new jar. This is a skill that is learned over time and requires a bit of practice. Experienced moonshiners generally run their stills until the alcohol from the wash has reduced to somewhere around 10-20 proof. It is not worth the time and energy to distill further to separate the little remaining alcohol from the water.

Let's Begin: *Grocery List: what you'll need for a 10-gallon recipe*

This recipe is completely scalable; if you want to make 5 or 20 gallons, simply half or double the recipe.

1. 1 can (12 oz.) Tomato Paste (not sauce)
2. 1 Lemon (large, or 3 small)
3. 2½ lbs. Potatoes (Any kind will work. You can just grab a cheap 5 lb bag and use half)
4. 20 lbs. White Sugar
5. 2 tablespoons of Baker's Yeast (Fleischmann's or Red Star, buy the 4oz. bottle instead of the packets to save money. If you have a Costco or Sam's nearby you can save a ton buying in bulk. Also, choose *highly active* if you have a choice.)
6. Fermenter. This is what will hold your mash for 1-2 weeks while it ferments.

There are a few options available here:

- 1-Brute trash cans are made of food-grade plastic and make great fermenters.
- 2-Local donut shops typically give away or sell filling buckets; these are also food grade and extremely cheap.
- 3-Buy new buckets from a local brewing supply store.

Mash (gallons)	Potatoes (lbs)	Sugar (lbs)	Tomato Paste (oz)	Yeast (oz)	Small Lemons
2.5	.625	5	3	.25	.75
5	1.25	10	6	.5	1.5
7.5	2	15	9	.75	2.25
10	2.5	20	12	1	3
20	5	40	24	2	6

Making the mash:

1. Boil approximately 2½ lbs. of potatoes, then mash completely. Making them runny is preferred because they will mix easier. Use a blender for best results!
2. Fill the fermenter with hot water equal to half the amount of your mash. If you're doing a 10-gallon recipe, that's 5 gallons of water. Any water you can drink is fine for this recipe, including tap.
3. Mix 20 lbs. sugar into hot water. Stir until completely dissolved. A large whisk is excellent for stirring.
4. Mix mashed potatoes in. Stir until dissolved.
5. Mix 12oz. tomato paste in. Stir until dissolved.
6. Juice one large lemon, add juice to fermenter mix.
7. Top up the fermenter with water.
Alternate between hot and cold to reach a target temperature of 80°F (27°C).
70-90°F is fine, but do not go over 95°F (35°C) or you may kill your yeast.
8. Once at target temperature, add 1 oz. (2 tablespoons) of yeast.
Stir until completely dissolved.
9. Place lid loosely on fermenter. You want to allow carbon dioxide gas to easily escape, but keep bugs from getting in. If you don't have a lid handy, a perforated cloth such as burlap works just as well as a lid.

10. Set out of direct sunlight and maintain temperature between 70-80°F (21-27°C)
11. Mash should begin to fizz or bubble within the first 24-48 hours.
12. Check daily until either all activity in the mash stops or the mash has been fermenting for 2 full weeks.
13. Distill promptly (within 3 days). If you're using your still for the first time, make sure you've followed the directions for first time use on page 2 of this document before you continue.

Precautions

1. Never leave a running still unattended.
2. Never drink while distilling.
3. Never block the outlet of the still. Doing so could result in overpressure and explosion.
4. Never use an open-flame heat source while distilling indoors.
5. Distilling outdoors is always preferred.

Setup

1. **Set the base of the still on your heat-source.**
2. **Pour in mash**, but take care to keep the sediments that have settled in the bottom of the container from going into the still since they can cause off-flavors. Additionally, leave about 3 or 4 inches of space at the top of the still to prevent boil over into the top section.
3. **Place the head of the still on the boiler.** Our stills need to have the head sealed. The sealing can be done using a thick water/flour mix and pushing it in and around the seam where the top and bottom meet. Another option is wrapping the bottom of the onion head with plumber's Teflon tape before setting it in the bottom part of the still.
4. **Attach condenser.** You can tape the pipe tube/condenser connection area together for a secure fit.
5. **Keep the condenser cool.** You don't have to worry about this step until your still's temperature gauge reads around **140-150°F**. Your condenser will have either one or two nozzles in addition to the moonshine outlet. You have many different options for keeping the coils inside the condenser cool. The most common way is to use a continuous stream of cool water from a water hose or kitchen faucet. For best results use a slow constant trickle of water.
 - **If one nozzle:** You can put your water source in the condenser directly and either let it flow out the top nozzle, or attach a plastic hose to the top nozzle and direct the water somewhere. You can connect your water source to the top nozzle or in the condenser directly and let it overflow naturally. Another option is to plug up the nozzle, fill the condenser body with water and continually add ice to keep it cool.
 - **If two nozzles:** You can connect the water source in the bottom nozzle and either let it flow out the top nozzle, or attach a plastic hose to the top nozzle and direct the water somewhere. An advanced method is to setup a **closed-loop system** by recirculating cold water from a water basin through your condenser. You can do this with a submersible water pump, a water basin (like a cooler or a bucket), and two hoses that you attach to your nozzles. And, of course, you have all of the 'one nozzle' options available by plugging up the bottom nozzle.
6. **Set a container at the outlet of the still to catch the moonshine.** Keep in mind that while some plastics are fine to use, most are not able to safely handle high concentrations of alcohol. Play in safe and use glass. Mason jars are excellent for this.

The Run

1. **Start applying heat.** Use high heat until you can hear the mash boiling. You can also carefully touch the pipe that connects the head to the condenser. When the still is up to operating temperatures this will go from cold to warm to hot very quickly. Once you reach this point, cut the heat to half and watch the temperature gauge.
2. **Throw away the foreshots.** As a precaution against methanol poisoning you will throw away the first 2 ounces per 5 gallons of mash. Since methanol boils at 144°F (62°C), it will boil first when you are distilling.
3. **Regulating heat.** Once liquid starts to come out of the condenser, you want to turn down the heat so that it is not a constant stream. Drips are fine, as are breaking or intermittent streams. But a constant stream means the temperature is too high. Pure alcohol boils at 173.3°F (78.5°C) while water boils at 212°F (100°C). The closer you get to 173.3°F (78.5°C) the more pure your product will be, but it will take longer to distill and have less taste. Conversely, the closer you get to 212°F (100°C) the weaker the product will be but it will have more taste and take less time. For your first run just split the difference and aim for 190-194°F (88-90°C) by adjusting the heat.
4. **Keep the condenser water cool.** Frequently monitor the condenser water temperature. Cold or cool water is great, lukewarm water is a warning that it needs to be cooler.
5. **Ending the run.** You will notice that once you get your heat set correctly it needs very little manipulation. This is one way to tell when you are done distilling. When you reach the end of the run you will notice that the gauge temperature will suddenly drop along with the moonshine coming out of the condenser. This will happen without any change in heat supply. Whenever you experience significant change in this manner, you can conclude that the run is over, so turn off the heat and allow the still to cool completely before cleaning.
6. **Once the still and mash are cool, dispose of the mash.** Flower beds are great because the wasted mash is extremely high in nutrients.
7. **Wash the still with dish soap and hot water then immediately towel dry.** If you are planning on running another batch immediately after, a quick rinse with water will suffice. The condenser coils can be rinsed with hot water. No soap is needed.

The Aftermath

Once you have your moonshine there are a lot of things you can do with it. Let's go over a few of the more common ones:

Cutting

This is the process of literally watering down the concentration of alcohol. The primary purpose of this is to add volume to alcohol. For example: 1 quart of 160 proof moonshine can be watered down to 2 quarts of still very potent 80 proof moonshine.

Re-distilling

This is the process of further increasing the proof of an already distilled moonshine.

Carbon filters

Carbon is used much like a water filter to remove bad tasting contaminants from moonshine.

Unfortunately, it also removes the good tasting flavors as well. Because of this, they are normally used to make a neutral moonshine that will then be mixed with fruits or wines later.

Flavoring

This is the process of simply adding flavors and/or sugar to a jar of moonshine to enhance the taste. From apple-pie to coffee, nearly everything can be used. Use a coffee filter to strain the mess after letting the concoction sit for a few weeks.

Ageing

Many types of liquor have a special ageing process that defines them, one example is Whiskey. Part of the process is that it is stored inside a charred-oak barrel for a specified amount of time. Since most beginner moonshiners do not have access to oak barrels this can be recreated by simply sharing a piece of white oak and putting it into a mason jar filled with moonshine. Over time the moonshine will age, turn color and become a very basic whiskey.

Questions? Need more information? Start your learning here:

Books: (we have links to these books on our website under our 'Blog' section)

The Alaskan Bootlegger's Bible by Leon W. Kania (**highly recommended**)

How To Make Whiskey by Bryan Davis

The Home Distiller's Workbook by Jeff King

Online:

<http://homedistiller.org/forum/>

Long-Term Cleaning and Maintenance

If you use your still just once or twice a year, it is helpful (but not absolutely necessary) to clean it with a vinegar or rye distillation before putting it away until the next distillation. Cleaning it in this way will get rid of any substances that may accumulate and be deposited on the walls of the still, from the pot to the coil.

The vinegar run (explained in detail on page 2 of this guide) consists of filling the still with water to 10% and vinegar to 10% of its capacity, and distilling it. Another option is a rye run, which consists of filling the still with water to 40% and rye flour to 5% of its capacity, and distilling it. Before carrying out any cleaning distillation check that the neck and coil are not blocked.

If you use your still fairly frequently, i.e. several times a year, you won't need to clean it with the vinegar or rye distillation. You can clean it with a water distillation or even no distillation at all. Just be sure to wash the still with dish soap and hot water after each distillation.

If you use the still to make essential oils, you must be very careful because these can stick to the walls of the pot and the tubes, and form a dangerous crust. All parts of the still must then be cleaned with warm water to get rid of the grease, especially in the condensation tube; otherwise it will eventually become blocked. Stills used to produce essential oils should never be used to distill alcohol drinks, as the copper will naturally become permeated with the oils and contaminate the drink, rendering it unfit for human consumption.

Regular use of your still will cause the copper to turn a deep red color. You should polish the outside with an appropriate polisher which contains no harmful substances. Wright's Copper Cream is an excellent polisher. Do not use abrasive substances. There are traditional methods that you can use to clean the pot, such as moistening a cloth in a solution of salt and lemon juice and rubbing this over the pot.

- Happy distilling!