

Traditional Mash or BIAB

Traditional Mash Method: At the core brewing is the fact that yeast metabolizes “simple sugars” into Carbon Dioxide (CO₂) and Ethyl Alcohol. This process is called fermentation. Herein lies the problem for the new grain masher as they contemplate their first non extract brew. Beer yeast cannot metabolize “complex” carbohydrates and starches. Malted barley is made up mostly of starch and carbohydrate and very little simple sugars. Luckily for us nature has provided us with a convenient solution to this problem. Although the malted barley is mostly carbohydrate, it also contains natural enzymes that, given the right conditions, can break the complex carbohydrate chains down to maltose and glucose which are the sugars your beer yeast likes to consume. NB: Other cereal or grains such as wheat, corn, and rye don’t have these natural enzymes so this is one of the main reasons why beer is almost always made from malted barley. So as a new mash brewer, we are going to assume that the only grain you are using in your beer is malted barley. If you are considering making beer using other types of grain such as corn or wheat, then you will be adding another layer of complexity (protein rests, additional boil sessions, and store-bought enzymes) to the process. It is easiest to start off with pure barley beers, and then once you have mastered this method, you can graduate up to making multi-grain beers requiring advanced protein rest or step mash procedure.

There are two types of enzymes we can discuss for our basic mash: Alpha-amylase and Beta-amylase. In order to understand what is happening here, you need to understand that starches and carbohydrates are essentially long strings of simple sugar molecules. They are too long and complex for our beer yeast to metabolize, so we need to reduce them, making them smaller and more simple. We use the Alpha-amylase enzymes in our barley to cut the starches into dextrin sugars that are made up of four or more glucose molecules. They are simpler than starches, but still too complex for our yeast. At the same time, we use the Beta-amylase enzymes to snip the ends of the chains down to glucose and maltose (maltose is a sugar molecule that is made up of two glucose molecules). Or so the science part of the process goes. Cracking the grain is another necessary step for the starch conversion and enzyme activation. sugar inside. Wheat and specialty grains such as crystal, chocolate, munich malt, etc. should also be cracked. This cracked grain is called the grist. The grist is what you will add into your mash tun. This step is best done in a roller

mill, we crack the grain we sell free of charge with our motorised roller mill. Next you need to select a good recipe. Start with a simple recipe like an IPA requiring just one base ale malt, maybe a little crystal, a single hop like Cascade and a good clean yeast (US-05). This way you can see exactly what your ingredients are doing and not get confused. You will find many recipes are American based and uses US gallons and fahrenheit rather than metric measurements. For this introduction I have loosely calculated back to metric to make it easier to understand

The first step is basically making a hot cereal “mash”. Start by mixing warm water and malted barley (around 1.4 litres of water per 450gm of grain), and bring this mixture up to a temperature between 60 and 70C. The simplest way to do this is to heat the water to say 75C before adding it to the grain. Once you stir this in, it will resemble the consistency of porridge, and it should be within your target temperature range. As a general rule, if your mash is on the lower end of the temperature range then you will have a finished beer that ferments out further making a drier, lighter-bodied beer. Alternatively, if your mash is on the upper end of the range, then your beer will not ferment out as far and will tend to be sweeter and have a fuller body but less alcohol.

The easiest thing for a new brewer to do is to aim for the middle of the range (66-67 C). But keep in mind that it is best to have a mash that is too cool than one that is too warm. Once the temperature gets above 71 C , the enzymes will be denatured quickly and you can’t bring them back once they are gone. If you were brewing 20 litres of beer, then a basic mash would consist of about 4kgs of grain mashed with about 12 litres of water at 67 C. You will hold the temperature for about 1 hour, stirring slowly about every 5 to 10 minutes. Every time you give your mash a stir, you will notice that the temperature will seem to change. This is because you are redistributing the heat through your mash tun. If you have the ability to add heat to your tun, then you may do so, but be careful. Usually by the time the thermometer registers that the temperature is perfect, the mash is already too hot. Your thermometer takes a few minutes to catch up to the realities in your mash tun.

The actual conversion of carbohydrates and starches isn’t visible. You are looking for the liquid in your mash start to clarify and the look much looser and liquefied compared to the original glutinous porridge. There will appear to be

clouds of protein material floating in the newly clarified liquid, and the surface of the mash will start to look shiny. This is a really good indication that your mash is working. A better test to do is to take a tablespoon-full of your mash liquid (make sure there aren’t any bits of grain in it), and add a drop of iodine to it in a test tube. Shake this mixture up quickly. If the iodide solution quickly turns the liquid black, then there is still a large concentration of carbohydrate. If the iodide solution doesn’t change colour quickly then your conversion is working well. After the mash is finished (about an hour or so, there is usually little point to going over 2 hours because your enzymes will give out by then), you will strain off the liquid to your boil kettle.

It may seem like a disappointingly small amount of liquid will come out of your grains on this first run. But we’re not done yet. The next step is to “sparge” or rinse the grains with hot water (77 C) water. All you are doing here is being frugal and washing remaining sugars off the grains and into your brew kettle. Depending on how high you want your OG reading to be, you will most likely use 1-2 litres of water for every 450gm of grain. Increasing your grain bill by an extra 1/2kg or so reduces the need to do excessive sparging and save you some time.

The basic method is to evenly sprinkle your sparge water over your grains (stirring helps), so that you get consistent coverage. It will take time for the sparge water to filter through the grain bed, and come out the tap. The sticky wort or “liquor” that comes out will start off as a strong flow, and then slow to a trickle over time. Remember over sparging will not only dilute your beer it will also give a grainy flavor. Under sparging results in a stronger beer but your yield will be less. Sometimes you just have to play around with the amounts until you get it right.

At this point we have run the liquid off to our kettle or boiling pot and will continue by bringing the liquid to a boil and adding hops per our favourite recipe. Boil time will vary but is generally for an hour or so depending on the specific style and hops used. Heating this liquid to a boil may take a while so be patient, and keep stirring to avoid burning sediment. Keeping the kettle covered may help the heating process, but be careful of the imminent boil-over. Your recipe will generally have hops added in multiple places but basically the first addition of hops extracts the “bitterness” of hop which balances the sweet-

ness of the malt whereas the late addition of hops will produce little bitterness and is for adding hop “flavour” instead. We will usually add some Irish Moss in the last 10 minutes of the boil to help prevent hazes. If you are using an immersion chiller it may also be added at this point to sanitise it with the boil heat. Once the boil is done an OG reading should be taken if not already done during the sparge. NB: Allow for temperature calibration as your brew hydrometer is generally calibrated at 20C. As your volume has dropped during the boil you may wish to compensate by topping up here, allow for this on your OG readings of course.

Finally we need to chill the liquid, ideally using an Immersion Chiller. We need to cool the wort rapidly at this point. This reduces the risk of infection from bacteria that want to ruin the beer. Bacteria love the warm temperatures (pretty much anything below boiling), so the quicker we can chill our wort and pitch the yeast, the less we have to worry about bacteria. Also the quicker the wort is cooled, the clearer the final product will be. The rapid chilling forms a “cold break,” a group of proteins that are thermally shocked and fall out of the wort, to the bottom of the kettle. If we cool down the wort slowly, we won’t get that cold break and the final product will have the dreaded chill haze. Chill haze is caused when you refrigerate your beer and proteins form a haze in your glass. The haze fades away as the beer warms, so it’s mostly a cosmetic problem, although some people say that beers without a cold break go stale faster. Once we are in our fermenter and at our desired temperature we can pitch the yeast and ferment as usual.

Brew In A Bag (BIAB) Method: is a newer method for grain brewing that grew out of Australia. BIAB is a much cheaper way for extract home brewers to make the small step to partial mash brewing or the full jump to all grain beers. The idea behind BIAB is to make the move with minimal additional equipment on top of the regular fermenting and bottling equipment and with less mash time. The BIAB method utilises a sturdy grain bag placed in a large brew pot to mash the grains, followed by a simple sparge step where the bag is removed from the pot and the remaining liquor is boiled as you would any other mash. While considered by some brewers to be less “efficient” than traditional methods, you can easily compensate for this by increasing the grain bill slightly. It does work best if temperature is maintained in the middle of traditional mash range, aim for over 65.5 C but under 69 C.

BIAB will only require you to have a large pot to use as a mash tun, a large grain bag (\$21.50) and an immersion thermometer

(\$10). We currently can offer the Turbo 500 electric still boiler base on special at \$199.90 which will hold well in excess of 25 litres, has a covered in 2000 Watt element, tap and lid OR a 35 litre Stainless Steel Pot with lid and handles on special at \$174.90 if you have a suitable heat source for this job.

Ideally you will also have an Immersion Chiller to finish off with. We currently make these to order, using the traditional material of copper which works as a heat exchange system and will rapidly drop the brew temperature down to pitch the yeast. Chiller coils are currently \$13.00 per metre, we would recommend at least 3 metres but consider 5 metres more optimal. Fit with food grade hose at \$3.10 per metre and a Rubber Cold Water Tap Fitting \$10.20. Run the water in at the base of the coil and back out the top.

BIAB is usually a single step infusion mash as with the traditional method, preheating the water in the mash tun to the desired temperature before adding the grains. However the entire pre-boil volume of water is used for the mash. NB: BeerSmith software is available to help you with your calculations for this step, working out strike temperature accurately. Once the water is heated suitably, line the pot with the bag, add the grain and cover. Allow an average of 60 minutes for the mash. Look at insulating the pot to help maintain the mash temperature. When done, remove the grain bag, lifting slowly out of the pot letting it drain the wort into the pot.

Once drained you can do a quick sparge over another vessel if you’d like while you are bringing the wort left in your pot to the boil and adding the hops. Continue of with traditional method of boiling, adding hops, Irish moss then chill the wort and ferment just as you would with any other recipe. If doing a partial mash, you can add your extract, hops and continue on also.

This is of course a condensed introduction to mashing, as with all brewing you will find there is many conflicting ideas and old-wives tales out there. It is really just trial and error but that’s half the fun isn’t it? Our advice, keep a good log book of your trials making notes as you go along. And of course always have a glass of beer in one hand while you stir the pot with the other.



Introducing You To Grain Mashing



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