



Partial Mashing

Partial mashing, sometimes referred to as mini-mashing, may appear similar to steeping specialty grains, but the crucial difference is partial mashing actively converts a bulk of the grain starches into fermentable sugars while steeping grains provide minimal fermentable sugars to the wort. In other words, the base malts that are soaked in a partial mash usually replace up to half of the malt extract normally used in an all extract or extract with specialty grain recipes.

The benefits of partial mashing affect brewers of all skill levels. New brewers experiment with partial mashes to get comfortable with the mashing process before moving to all-grain brewing. Apartment and small-space brewers are attracted to partial mashing because of the minimal equipment it requires while still being able to mash some base malt. Homebrewers of all skill levels who utilize mostly extract will sometimes partial mash in order to use grains that require a mash step.

Converting to Partial Mash

For the purpose of this partial-mash example, we will be using the recipe used for the extract with specialty grain tutorial, Port O'Palmer Porter. In this recipe, there is 6.6 lb (3 kg), or two cans, of liquid pale malt extract, where most of the fermentable sugar for the wort is derived. For the partial-mash, reduce the liquid malt extract to 3.3 lb (1.5 kg), or one can, and the remaining fermentable sugars will be extracted from pale base malt during a mini-mash process.

To determine the amount of base malt needed to replace extract, two conversions can be used. If using liquid malt extract, like in Port O'Palmer Porter, divide the amount (in pounds) of liquid malt extract you want to replace by 0.75, and this will give you the appropriate amount of base malt in pounds. If using dry malt extract, divide the amount (in pounds) of dry malt extract you want to replace by 0.6, and this will give you the appropriate amount of base malt in pounds.

Most extracts have a corresponding grain for substitution-- for example, pilsner malt extract should be substituted with a pilsner malt. In Port O'Palmer we are replacing a can of pale liquid malt extract with pale base malt. You can adjust the amount of extract you would like to replace, just follow the appropriate equations to ensure correct grain amounts. Here is what the conversion looks like for this example:

$$\text{weight of liquid malt extract (lb)} / 0.75 = \text{weight of base malt (lb)}$$

$$3.3 \text{ lbs of liquid malt extract} / 0.75 = 4.4 \text{ lbs pale base malt to mash}$$



Equipment needed for a Partial Mash

A partial mash is carried out just like a full-scale mash, but the volume collected is only the 3 or 4 gallons that you would normally boil when brewing with extract. You can mash in either a pot on the stove, the simplest method, or utilize a small beverage cooler with a manifold for separating the liquid wort from the grain solids (for more information on building a mash tun see Appendix E of John Palmer's How To Brew or the Building a Mash Tun video). If you use a pot, you will need a way to separate the grain, such as a strainer or grain bag.

Now that you have determined the amount of base malt needed to replace a can of extract and the required equipment, it's time to start mashing! The following procedures are based on Chapter 19 of John Palmer's How To Brew.

Conducting a Partial Mash

Let's review the recipe that we converted:

Ingredients for 5 U.S. gallons (18.9 L) of Port O'Palmer Porter:

- 3.3 lb (1.5 kg) | Pale liquid malt extract
- 4.4 lb (1.99 kg) | Pale malt
- 0.5 lb (227 g) | Crystal malt
- 0.5 lb (227 g) | Chocolate malt
- 0.25 lb (133 g) | Black Patent malt
- 0.5 oz (14 g) | Horizon hops, 12% alpha acid (60 minutes)
- 0.75 oz (21 g) | Willamette, 5% alpha acid (40 minutes)
- 0.5 oz (14 g) | Willamette, 5% alpha acid (20 minutes)

Specifications:

Original Gravity for 5 gallons: 1.054 (11.7 °P)

IBUs: 38

Determining Mash Temperature

Mash temperatures and rest times will largely depend on the style of beer you are brewing and the grains being used. For brewers new to mashing, sometimes it can be helpful to review recipes for similar styles to see what the mash schedules look like. For this recipe, we will aim for a mash temperature of 152°-153°F (66.7-67.2°C) for 60 minutes.



Strike Water Volume and Temperature

When mashing, it is important to measure the water, take into account grain absorption, and have a specific temperature to maintain. This requires some practice, which is why partial mashing is a great routine to master before moving on to all-grain brewing.

Strike water, how brewers refer to the water they are preparing for the mash in, has to be a specific volume and a specific temperature. For the volume, most recipes utilize a ratio of 1 – 2 quarts of water per pound of grain being used. For example, if you are mashing in 5 lb of grain at a ratio of 2 quarts per pound, you would have a strike volume of 10 quarts, or 2.5 gallons. For Port O'Palmer Porter, we will use an average ratio of 1.5 quarts of water per pound of grains. This will give you a strike volume of 6.6 quarts of water, or 1.65 gallons of water.

total weigh of grains (lb) x grain to water ratio (qt/lb) = strike water volume

4.4 lb of pale malt x 1.5 quarts per pound of grain = 6.6 quarts (1.65 gallons)

When adding the grains to the strike water, the temperature of the water will be brought down because of the cool grain temperature. Because of this, it is necessary to heat the strike water above the target mash temperature to compensate for the heat loss. Determining temperature loss is slightly difficult to generalize because it will largely depend on your process and equipment. A good rule of thumb is to add 8-12°F (4.4-6.6°C) to your desired mash temperature and use this as your target strike water temperature. As you conduct more partial mash batches, it will become apparent how much heat is typically lost when adding grains and you can adjust your process accordingly. If the mash temperature is off by a degree or two, don't worry too much about it. If it is exceptionally high, stir until you hit your desire temperature; if too low, slowly add boiling water until your reach your desired mash temperature. For this recipe, plan to heat your strike water to 160-162°F (71.1-72.2°C).

Overview:

Strike Water Volume: 6.6 quarts (1.65 gallons)

Strike Water Temperature: 160-162°F (71.1-72.2°C)

The Mash

In the vessel you are using to mash, bring your determined strike water volume (6.6 quarts) to the appropriate temperature (160-162°F). Stir in the grains (both base and specialty malts), ensuring there is not any malt left dry or in clumps, cover, and wait 60 minutes. It is best if you do not remove the lid because this will cause heat to escape and drop your rest temperature.



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After 60 minutes, stir the mash and separate the liquid wort from the grain solids, a process known as lautering. If you are using a standard pot, a strainer or grain bag can be used to separate. A mash tun will have a manifold for draining the wort.

When the wort is collected, add enough water to reach your desired boil volume, in this case 3 gallons. If you want to take the mini-mash one step further, you can heat up the water to reach your pre-boil volume to about 170°F and pour this over the grains left over from the mash. This process is referred to as sparging and will rinse any leftover sugars out of the grains. However, this step is not essential for partial mashing since extract will be used to make up for the rest of the fermentable sugars.

Once you have your pre-boil volume, add half your extract, conduct your boil and add the other half at flame out, or add all the extract at flameout. Post-boil procedures can be carried out as you would any batch of beer.