



## **ALL GRAIN BREWING FOR BEGINNERS**

For beginning all-grain brewers the easiest mashing technique to learn is the British infusion mash. The goal of the infusion mash is to combine crushed, room-temperature malt (20° C) with water at a much higher temperature (72° C) to reach a temperature in between (65° to 69° C). Once the mash is well mixed, it should be held at the conversion temperature (65° to 69° C) for an hour rest. Further temperature adjustments should not be necessary. Maintaining the conversion temperature during the rest allows the enzymes to fully react with the starch, yielding a suspension of grains, water, and sugar.

When the conversion is over, the goal is to remove the sugary wort from the spent grains. A false-bottomed vessel with a spigot at the bottom makes this possible. During run-off and recirculation, the brewer collects the wort from the mash and sprinkles it back over the top of the grains. The idea is that the grain bed will act as a filter and the run-off will become less cloudy. This doesn't always work well and is not terribly critical for the first few brews. If your wort does not run any clearer after 15 minutes, move on to the next step.

After the run-off and recirculation is complete, it is time to sparge. This involves sprinkling hot water (65° C) over the mash to remove the last of the remaining sugar. After collecting 23 litres, boil the wort and treat the batch the same as you would an extract brew.

### **Equipment**

Most likely you will need to update your brewing equipment for mashing. However, infusion mashing requires no fancy, expensive devices.

**Kettle:** The kettle will be used for heating the mash water, heating the sparge water, and boiling the wort. It should have at least a 30 litre capacity for making 23 litres of beer. A stainless steel pot works best. Avoid aluminium pots.

**Mash tun / lauter tun:** This should have the holding capacity for a 23 litre batch. The basic structure for an infusion mash tun is a container with a lid, such as a bucket, a picnic cooler, or a pot, with a false bottom and a spigot on the side near the bottom. The false bottom can be any straining device that retains the grains and allows liquid to flow through. A simple, cheap design is a 23 bucket with a large, nylon-mesh bag inserted. The bag should be large enough to fill the entire bucket and fold over the top. A spigot is fitted by drilling a hole on the side and screwing in a simple plastic spigot. Rubber gaskets on both sides and a tight fit should keep it from leaking. Another simple and effective design consists of a picnic cooler fitted with a false bottom. For the bag-in-a-bucket design, you will need to insulate the mash tun. Sleeping bags work well. Make sure you wrap your mash tun in a plastic garbage bag first or the mash may leak onto your sleeping bag.

**Other stuff:** You will also need two 23 litre buckets for collecting the wort, a spoon, and a pitcher for pouring the sparge water.

**First Mash:** Classic Porter

If you are going to use a traditional English mash method, you might as well make a traditional English beer such as porter. The following is a guide to brewing porter by infusion mash for the beginning all-grain brewer.

## Charismatic Mega-Porter

Not only does this beer look good, it's big in flavor.

### Ingredients:

3.6 kgs. British pale ale malt (Maris Otter)

340gms. Crystal malt, 60° Lovibond

340gms. Chocolate malt

55gms. Roasted barley

30gms. Northern Brewer hops (10% alpha acid), for 60 min.

30gms. Golding hops (5% alpha acid), at end of boil

Ale yeast (Wyeast 1098 British ale)

### Step by Step:



1. Crush the grains. Consider having your grains crushed by your local brew shop, at least for your first few brews. This will save you the cost and hassle of milling. To ensure freshness, have your grains crushed the week of the brew if possible.

2. Prepare the mash water. For your first few batches it may be easier to use purified water that you can purchase in bulk at the grocery store. If you use tap water, you should boil it first and allow it to settle overnight. This will drive off any chlorine and precipitate  $\text{CaCO}_3$  (calcium carbonate). As you become more advanced, you may choose to request a water report from your local water district and adjust ions based on that report.

3. Calculate the mash water needed. Here's the formula:

2.5 litres of water x kilogram of grain

For this recipe that means:  $2.5 \times 4.335$  kilograms = approximately 11 litres (10.83) of mash water.

4. Heat the mash water. Assuming the grains are at room temperature, you want to mash in at  $72^\circ \text{C}$ . Since some heat will be lost when the water is transferred from the kettle to the mash tun, heat the water to  $75^\circ \text{C}$  over a stove.

5. Mash in. Carefully transfer the water to the mash tun. Cool by stirring with a spoon until the temperature reaches  $72^\circ \text{C}$ . Then mix in the grains, making sure any clumps are broken up. As soon as the mash is mixed, cover and insulate your mash tun to maintain the temperature. After 10 minutes, quickly check to see if the mash is in the temperature range of  $65^\circ$  to  $75^\circ \text{C}$ . If it is below, you can add hot water to boost up the temperature. If you are above, cool by stirring with the lid open.

6. Hold conversion rest and prepare the sparge water. If the mash is within the temperature range, hold at conversion temperature for an hour. During the last half hour, heat the sparge water to  $75^\circ \text{C}$ . Use the same quality of water for the sparge as you did for the mash.

7. Mash out and recirculate wort. When the conversion is finished, a thin layer of sweet, clear liquid will cover the mash. Set your mash tun on a counter and place a bucket below the spigot to collect the run-off. At first the run-off tends to be cloudy. You can help clarify it by recirculating the run-off over the top of the grain bed. Do not let the bed run dry. Keep it wet by constantly recirculating. Do not disturb the bed by pouring the wort directly into it. Hold a spoon over the mash and pour the wort onto the spoon to make the wort flow more gently and evenly over the bed. Don't recirculate for more than 15 minutes even if the run-off does not clarify.

8. Sparge. After you have finished recirculating, begin to collect the wort in buckets. As you sparge, remember to keep a thin layer of water over the grain bed and to apply the water gently and evenly over the mash. Sparge with water at 75° C until a volume of 23 litres is collected.

9. Give yourself a pat on the back. Congratulations, you have just completed your first infusion mash.

Treat the rest of the brew as you would an extract beer. Pour all 23 litres of wort into the kettle and heat to a boil. Boil for a total of 90 minutes. The first hop addition should be made 60 minutes before the end of the boil. Add the second addition as soon as the boil ends. Cool and aerate. Pitch yeast at 23° C. Ferment at 15° to 18° C. Rack off of yeast after fermentation and age for two weeks before bottling or kegging.

OG = 1.055

FG = 1.013

