



All-Grain Brewing Instructions

Another MoreManual!

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INTRODUCTION:

Welcome to the next level of brewing!! This instruction guide is merely intended to give an “extract” savvy brewer a basic instruction to “all-grain” brewing. These instructions are for an easy single-infusion all-grain process.

EQUIPMENT REQUIREMENTS:

The basic requirements are as follows: Boil kettle (capable of collecting 2-3 gallons more than the intended final volume), Mash tun (vessel at least as big as the intended final volume, also has to have a false bottom or something that allows the sweet wort out), and finally a hot liquor tank (vessel that can hold hot water to sparge with.) Other pieces of equipment that aren't required, but help, include a pH meter, sparge arm/ring, stand to hold the vessels, pump (if not gravity from vessel to vessel), mash paddle, mill, a good thermometer, and Promash software. Although not equipment, water modifiers such as calcium sulphate (gypsum), calcium chloride, lactic acid, etc. are helpful for adjusting water pH.

Recipe Formulation:

Before actual brewing can commence you have to formulate a recipe. The grain portion of your recipe is called the grain bill. Base malts will comprise the majority of the grain bill while specialty malts will help to define the flavor and style. Recipe formulation should be taken seriously to the point where the brewer has read and understands what each ingredient will do for the beer. Be wary of random recipes from the web or old books. Anyone can make a recipe sound good. Take ideas from everywhere but also consult the experts at Beer, Beer & More Beer or someone with a fair amount of all-grain experience. The best book on recipe formulation is *Designing Great Beers* by Ray Daniels. This book should be a requirement for everyone who plans on doing all-grain brewing.

THE MASH: (ENZYME PROCESS CONVERTING STARCHES TO SUGARS)

Mash Water Calculation - The part of the grain bill that is of particular interest is the total pounds of malt to be used. From this number we can figure out how much water we need in the Mashtun. As a basic rule of thumb we recommend 1.1 quarts per pound of malt. When doing this calculation please be aware of how much “dead space” you have under the false bottom and add that water to the needed amount.

Calculate mash water _____ lbs x 1.1 qts = ___ /4 = _____ Gallons

Filtering Water – If you are using water from a municipal source you will want to filter with a carbon activated filter to remove chlorine or chloramines. Carbon filtering also has the advantage of removing any bad flavor that is organic in nature. Fill your Mashtun with the amount of calculated mash water.

pH Adjustment – You need to adjust the pH of the mash water. While you can all-grain brew without doing any pH adjustment, we suggest lowering the water pH to improve efficiency and flavor. A general rule of thumb is you want a 5.2-5.5 pH after the grains have been mixed in. Since it is very difficult to alter the pH after you dough (mix) the grains in, we suggest changing the water pH before you add the grains. We suggest starting with a pH of between 6.0-6.5. Please note that dark grains are more acidic, hence recipes with dark grains usually do not require that the pH of the mash water be lowered as much. For more info on pH try *An Analysis of Brewing Techniques* by George Fix.

Mash Temperature – Plays a very important role in flavor of the final beer. Holding a mash temperature between 148F and 158F for 60 minutes is sufficient in activating the enzymes that are naturally within the barley. These are the enzymes that turn the starches into sugars. Within that range, the low end (148-152F) will produce an overall dryer beer, while the high

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Mash Temperature (cont.) – end (154-158F) will produce a slightly more viscous beer with a maltier flavor. The middle range of 151-154F is a great compromise for most beers. When adding the grain to the water plan for temperature drops of 9-15 degrees due to the fact that the grain is sitting at room temperature.

Mashing – Calculate the mash temperature you want and figure on a drop of 10 degrees if you are in a warm environment and 15 degrees if you are in a cold environment. Promash software will help you to figure this out and we highly recommend this software. Always add grain to water, not water to grain to avoid the formation of dough balls. Add the grain slowly while stirring. Continuing stirring for a few minutes after the grain has been added to make sure that the entire mash is a consistent temperature and that all dough balls have been eliminated. In most scenarios letting the mash sit for 60 minutes at 148-160 will result in full enzymatic conversion of the starches to sugars. Make sure that the lid is placed on the mash to retain heat. If you are brewing in a very cold environment you might consider insulating the mash vessel, however in most situations the large thermal mass of the mash will hold the temperature just fine. If you should miss the temperature it is easiest to add hot water or cold water to move it a few degrees. We do not recommend adding flame under the vessel, as it is very easy to scorch the grains causing off flavors. Other methods such as “R.I.M.S.”, Decoc-tion, and “S.M.A.R.T.” systems can be used to control the temperature. For more information on these types of systems consult one of the all-grain experts at Beer, Beer & More Beer.

Recirculation – A little step in between mashing and sparging that helps to clear up the run off from the mash. We recommend recirculating the wort by removing some from the spigot below the false bottom and adding back to the top of the grain bed. A pitcher works great for this purpose. Do this until the runoff is nearly free of visible debris, then you can start the sparge.

THE SPARGE:

(RINSING THE SUGARS OUT OF THE MASH AND INTO THE BOIL KETTLE)

Calculating Sparge Water - An easy way to calculate sparge water is to plan on using 1/2 gallon for every pound of grain used in the mash. This is a simplified calculation that will allow you to be sure you have more sparge water than you actually will need.

Sparge - Again, the pH of the water is important. A general rule is to adjust the pH to between 5.5-6.5. By acidifying the sparge water you help to insure that the tannins from the husk don't get absorbed into solution during the sparging process, and carried into the boil kettle. Temperature also plays a key roll in sparging; it is best to be as close to 170F without going over. At this temperature you will dissolve the sugars without leaching tannins from the grain husk. As always, it is better to filter the water. To begin the sparging process open the Hot Liquor tank valve and allow the water to flow onto the grain bed. A simple hose will work for this process however a stationary sparge arm is a time saving addition. Connect a piece of tubing onto ball valve on the mashtun and allow it to run into the boil kettle. Open the valve on the bottom of the Mashtun allowing the hot sparge water to flow through the mash. Try to get the same flow of water coming into the mashtun as wort flowing out of the mashtun and into the boil kettle. Keep at least a two-inch layer of water on top of the grain bed to keep incoming sparge water from channeling through the grain. We recommend a slow sparge, usually taking 45-60 minutes to insure that there is plenty of time for the sugars to go into solution .

THE BOIL:

Sparge until you have collected 1-2 gallons of wort over the final amount you want (depends upon your batch size and boil off rates). Add hops and any other ingredients as the recipe calls for. A good boil-off amount is 10% of the starting volume. Additionally you will be leaving some liquid behind in the break and hop matter that should be left in the boil kettle. It is generally a good idea to add Irish moss or Whirlfloc with 20 minutes left in the boil to aid in hot break separation.

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OVERVIEW OF ALL GRAIN BREWING:

1. Clean and set up all-grain system
2. Create recipe
3. Calculate mash water _____ lbs x 1.1 qts = ___ /4 = _____ Gallons
4. Heat/treat water for mash (152-154F + ___F for temp drop) (pH between 6.0-6.5)
5. Stir in grains for 3 minutes
6. Mash for 60 minutes
7. Heat/treat water for sparge
8. Sparge for 45-60 minutes
9. Collect 1-2 gallons more than final volume
10. Proceed as you would in an extract batch



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