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Brewing Northern Brewer Partial Mash Kits

- Supplement to the General Beer Kit Instructions

Partial mash brewing takes the experienced homebrewer to the next level of creating high-quality beer. Mashing allows you to create beers that can't be brewed with malt extract alone. Our partial mash kits contain grain which has starches that must be converted to sugars by mashing. These adjuncts, such as maize, flaked barley and oats, must be converted with enzymes supplied by base malts.

In addition to the basic brewing equipment you already have, you will need the following:

- An accurate thermometer.
- A *mash kettle* – a pot with sufficient volume to hold all the grain plus one gallon of water.
- Another pot for heating sparge water. It should be at least one gallon in capacity.
- A large strainer, capable of holding up to four pounds of grain.

Some new terms you will encounter on your partial mash brewing excursions:

- **Adjunct** – an unmalted grain that has no diastatic power; must be mashed with diastatic malt to achieve saccharification.
- **Base malt** – malted barley that contains the diastatic enzymes necessary for starch conversion in the mash, Base malt makes up the majority of the *grist* or grain bill in an all-grain or partial mash recipe; different from *specialty malts* like crystal malts and roasted malts, which do not have diastatic power. Base malt can be an *ale malt* (e.g. Maris Otter) or a *lager malt* (Pils or Munich).
- **Conversion** – the breakdown of complex starches or proteins in the mash as a result of enzymatic action.
- **Diastatic** – containing enzymes that break large, unfermentable starch molecules into simple sugars that are fermentable by yeast.
- **Enzyme** – molecule with a specific function (a bit like a computer program); diastatic enzymes in base malt break down starch molecules.
- **Mash** – a mixture of grain and hot water; the purpose of a mash is to convert complex grain starches into simple sugars that can be fermented by yeast; mash (used as a verb) also refers to the process of mixing, heating, and insulating this grain and water mixture.
- **Rest** – holding the mash at a specific temperature for a specific length of time; commonly-used mash rests are a protein rest at 122°F for 20 minutes, a saccharification rest at 150° - 158°F for 60 minutes, and mash-out at 170°F for 5 or 10 minutes; you may use some or all of these, depending on your recipe.
- **Runoff** – the liquid collected in the boiling kettle during the sparge, including the liquid portion of the mash and the sparge water; this is the beginning of the wort.
- **Saccharification** – the conversion of starch to sugar in the mash; occurs between 149° and 158°F.
- **Sparge** – the process of separating the grain from the liquid portion of the mash and rinsing the mashed grain with hot water to extract the sugars created in the mash; also known as *lautering*.

Prior to Brewing Day – On Brewing Day

1. **Pre-brewing preparations.** Follow steps #1 through #3 of the General Beer Kit Instructions to incubate yeast and crush the grain.

On Brewing Day

2. **Collect and heat mash water.** Measure one gallon of brewing water into the mash kettle and begin heating it. *Refer to the kit inventory to determine the temperature of the first mash rest.* Stop heating the mash water when the water temperature is 10°F ***above*** the first mash rest.

3. **Add grain to the mash water.** Add the crushed grain and adjuncts to the hot mash water, stirring well to break up any clumps. The temperature should stabilize at or near the rest temperature specified by the kit inventory. For your first mash, do not expect to hit the mash temperatures exactly. Don't panic—your actual mash temperature can differ from target temperatures by up to 5° F, and you will still get good results. Cold water can be added to correct if you overshoot the target temperature.

4. **Mash rest(s).** Rest the mash according to the first temperature and time given in the kit inventory. Remove the mash kettle from the stove and insulate it to help maintain a steady temperature; you can wrap it in old blankets or towels, or place it in a warm (***not heating!***) oven.

   The protein rest occurs at 122°F; during this rest, proteolytic enzymes break down large protein molecules, which enhances clarity, body, and head retention. Protein rests are used when brewing with lager malt, but aren't needed when brewing with ale malt.
   The saccharification rest occurs between 149° and 158°F; during this rest, diastatic enzymes break down complex starch molecules, creating fermentable sugars. All mash schedules include a saccharification rest.
   Mash-out occurs at 168°-170°F; the purpose of this rest is to maximize extraction of sugars from the grain during the sparge.

   When it's time to raise the temperature of the mash to the next rest, return the mash kettle to the stove and apply very low heat – rapid heating can scorch the mash. Stir well to distribute the heat and measure the mash temperature frequently. When the next rest temperature is reached, repeat the insulation procedure.

5. **Collect and heat sparge water.** When the mash is in the final 15 minutes of its final rest, collect one gallon of sparge water in a second pot and heat it to 170°F. This water will be used to rinse the grains when they are separated from the liquid in the mash.

6. **Sparge the grain.** When the mash is complete, pour the entire contents of the mash kettle through a colander or strainer, collecting the liquid in the boiling kettle. The rich, dense wort that comes straight out of the mash is called the *first runnings*.

   Gently pour the sparge water, a cup or two at a time, through the grain in the colander/strainer; collect these *final runnings* in the boiling kettle along with the first runnings. The goal is to rinse sugars out of the grain and leave behind as much husk and solid grain particles as possible.

   This combination of first and final runnings is the beginning of the wort.

7. **Boil the wort and add malt extract and hops.** Continue with step #6 of the General Beer Kit Instructions, adding remaining ingredients as specified in the kit inventory.