

IMPROVING BREWHOUSE EFFICIENCY by Mike Retzlaff

Last time, we went through the process of calculating brewhouse efficiency and a few reasons to even bother doing it. Now we will look at some of the things we can do to improve our collection of extract from grains.

Fresh ingredients and a proper crush are important. If you're buying your malt from Brewstock and having it crushed there, you're in good shape. Brewstock has a good turnover of malt and their roller mill provides a good crush. I used a Corona mill for years but the crush was far less than optimal. I upgraded to a roller mill and my brewhouse efficiency did improve but the biggest benefit was a uniform crush with less damage to the hulls.

The major purpose of mashing is to degrade proteins, gums, and starches in the grain. There are a number of mashing methods and this short article can't begin to address all of them. Most of us use single infusion mashing which works just fine for most beers. Conventional wisdom tells us to mash for an hour and then do an iodine test. There is a lot more going on in the mash than simply converting starch into sugars. What really illustrated this to me was an interruption in my brew day some years ago. At 25 minutes into a single infusion mash, I was called away. About 3 hours later I got back to finishing that batch of beer. After the boil, I chilled the wort and checked the OG. I found it 2 to 3 gravity points higher than expected. I pitched the yeast, snapped on the lid, and put it away to ferment. It nagged me for a while over how and why I got that extra gravity. I then remembered Dave Line's "Big Book of Brewing" which was the first brewing book I ever bought. He suggested an overnight (8 to 10 hour) mash, but at a minimum, two hours. He went on to explain that the mashing is not complete when the iodine test indicates an apparent lack of starch. I fathomed that some of the starch, shielded in the larger pieces of the crushed grain, takes longer to hydrolyze and so more of it is converted over time. He stated that some of the malt sugars need further reduction to provide a balanced wort. This overnight mash also breaks up your brew day by allowing you to start the mash in the evening, let the mash work while you sleep, and then finish up the brewing the next morning.

The purpose of the mash-out is oft times explained as "stopping all enzymic action", "denaturing the enzymes" or "killing the enzymes." It does this but the boil they'll shortly endure should take care of the "killing" part. Raising the mash to a mash-out temp decreases the viscosity of the wort and makes it easier to extract the sugars into the kettle. Many homebrewers don't mash-out for one reason or another. Unless you've mashed to provide a wort high in dextrans, the mash-out can be skipped. The mash-out can increase your efficiency but to a much lesser degree than the next step in the process.

The lauter and sparge is the area in which most of us can really improve our efficiency. I've read many debates over batch vs. fly sparging and over the years, I've used both methods. When properly done, both do a fine job although a few tests give a slight edge to fly sparging. In either case, a slow lauter is the number one trick in coaxing the sugars out of our mashed grist. Close down the valve to the point of taking about 90 minutes or more to finish running the wort into the kettle. On a five gallon batch, the stream of wort I run into the kettle is about the size of a ball point pen cartridge. This one little trick will boost your brewhouse efficiency a lot more than you might imagine!

The next time you brew, check how much liquid is left in the bottom of your lauter tun when you've finished collecting. Check to see if that diluted wort or the spent grain is sweet. If either is, you're losing extract and it's probably due to rushing the collection of wort. There is always system loss to grain absorption but hopefully we've already rinsed out all the good stuff. Check over your entire system to see where you're losing wort during transfers. Whether losing wort in the system or spilling it on the floor, it's still a loss. Be creative and save a little here and there as it all adds up.

Just a few changes to our brewing regimen can boost brewhouse efficiency without costing us much more than a little time. The focus shouldn't be on the saving of 50 cents or a dollar per batch but of taking command of our equipment and processes to become a better brewer. On the other hand - hey, that's free extract!