

## Impact of hop bags

Written by Mark Emiley

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I recently conducted an experiment to find out how significant of an impact using hop bags (as compared to letting hops boil freely in the wort) had on bitterness and hop flavor. To conduct the experiment, I used the base recipe from the Variant competition (a cream-blond ale). I steeped the specialty grains and then split the run-off from those into the two batches (which were done using malt extract to reduce any variables from all-grain batches). One batch I threw the pellet hops straight in for both bittering and flavoring and the other batch I added the hops at the same time but in fine mesh bags. The hop additions were 1 ounce of Cascade hops at 6.8% AA for 60 minutes, ½ ounce of Santiam for 15 minutes and ½ ounce of Santiam for 5 minutes. I will note that I conducted my boils with a full five gallons (while this is representative of all-grain batches, there are a few differences that this would exist with extract version (such as larger sugar losses due to separating hops and reduced overall hop extraction due to higher specific gravity). I inoculated with the same dry yeast and fermented each of the brews next to each other.

Observations: The first difference with the two batches was removing the hops. With the hops bags, it was obviously easy to use a set of tongs to pull out the bags and give them a good squeeze to save as much of the wort as possible. Without the hop bags, the best way to remove pellet hops is to whirlpool your wort to get a “pile” of material in the center of your pot and then siphon away from the side. Needless to say, this leaves a fair amount of your wort left in the spent hops, reducing the amount of fermentables that you will have in your beer. To get an equivalent amount of wort between both batches, I had to add some water to fill the fermentation vessels up to the same level. In the “free boil”, my starting gravity was roughly 0.003 lower than my bag boil. This loss would be even greater if a smaller amount was boiled (as the density of the wort left in the hop pile would be higher).

The fermentations conducted at about the same rate. The free hop batch did end up relatively cloudier. At tasting, despite the relatively low amount of hops used, there was a noticeable difference in bitterness favoring the free hop batch. I don't have a way to quantify it, but given that the additions were pretty small, the fact that it was perceivable sticks out. It was not extremely pronounced, but if forced to put a measurement to it, I would say roughly 25% more bitter. I was unable to notice much difference in the hop flavor or aroma, once again, for the amounts used, would have been pretty small anyhow. As a side note, the free hop beer ended up slightly “apple” and the bag hop beer had a slightly better malt profile, but once again, these were relatively small differences.

Overall, I would say that there is a definite isomerization impact from not conducting a “free boil”; however, that increase has to be justified against the losses of wort in hop material as well as the increased difficulties in separating the wort from the hops.

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Personally, I will continue to use a hop bag and probably increase my hopping rates to make up for the differences if trying to copy a recipe. An extra quarter or two is a fair price for me to pay for getting clearer wort as well as the ease of hop removal.