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Home Brewing

Brew in a Bag (BIAB)

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What is Brew In A Bag (BIAB)?

- ▶ All grain method using a single vessel for both mashing and boiling
 - “Traditional” BIAB involves a full volume mash, with no separate sparge water added
 - Some variations
 - Split mash can be used if one vessel is too small

History



- ▶ Current BIAB method evolved on the Aussie Home Brewer forum in 2006
 - A new brewer (James Squire) asked why we could not use a single vessel for mashing/boiling?
 - Andrew Clarke did some early tests using full volume sparges on traditional equipment
 - Pat Hollingdale (who later founded BIABrewer.info) did some of the first single vessel BIAB work
- ▶ Basic idea is not entirely new
 - In late 70's and early 80's some pioneers were using single vessel systems for mash and boil
 - Plastic bucket with heating element, second pail inside (Dave Line and others)

Why Bother?

- ▶ Traditional Equipment



HLT, Mash Tun, Boiler

- ▶ BIAB Equipment



Boiler and Bag

Cheap and easy entry point for All Grain Brewing

BIAB Equipment



▶ The Boil Kettle

- Needs to be large (full boil volume plus grain)
 - Hold pre-boil volume plus 1 quart per pound of grain
 - Minimum 9 gallons for a typical 10lbs and 5 gal batch
 - 10+ gallons better for high gravity batches

▶ The Bag

- Polyester cloth or mesh capable of holding 10–15 lbs of wet grains (test it with 15+ lbs)
- Can be either simple pocket or cylinder design
- Usually hand made to fit pot with a drawstring at the top

BIAB Equipment



▶ Other Equipment

- Burner capable of boiling 6–7 gallons
- Fermenter, siphons, bottling equipment is the same as a typical extract or all grain batch
- I use leather gloves for lifting the bag out

BIAB Process – Sample Batch



Goal: Brew all grain with minimal equipment, and minimal time

2:45pm – Heating Mash Water



BIAB Process



3pm - Adding Grains for Mash

3:40 Iodine Test Confirms
Mash is Complete



BIAB Process



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3:45 Lifting Grain Bag Out

4pm - Boiling with Hops (60 min)



BIAB Process



5pm - Started Cooling
5:30 - Transfer to carboy
5:45 - Cleaned pot, rinsed off
other equipment
6pm - Cleanup complete

Total BIAB brew day:
3 hours, 15 minutes including
cleanup

Cut about an hour off my
typical brewday by not sparging
and also reduced cleanup



BIAB By the Numbers

- ▶ BIAB grain absorbs less water
 - Because grain is compressed in the bag when removed, it retains less water (about 40% less)
 - Roughly 0.6 liter/kg (0.3 qt/lb) for BIAB versus about 1 liter/kg for traditional mash

- ▶ Full Volume Mash drives a high water/grain ratio – roughly double a conventional mash
 - Typical 3-tier mash is 1.25–1.5 qt/lb
 - BIAB mashes at around 3 quarts/lb



Typical Batch Calculation

- ▶ Brewing 5 gallons with 10 lbs of grain:
 - Assume 7 gallon pre-boil volume
 - Grain absorbs: $10\text{lbs} \times 0.3 \text{ qts/lb} = 0.75 \text{ gal water}$
 - No mash deadspace, since we have no mash screen
 - Mash water infusion = $7 + 0.75 = 7.75 \text{ gallons}$
- ▶ Will it fit in my pot?
 - Add 0.31 quarts/lb for the space grain occupies
 - $10 \text{ lbs} \times 0.31 = 3.1 \text{ quarts or } 0.75 \text{ gal}$
 - Need a pot of $7.75 + 0.75 = 8.5 \text{ gallons}$

Need a Large Pot for High Gravity BIAB Beers



Typical Batch

- ▶ Infusion Temperature
 - Use your favorite program or online calculator
 - 7.5 gallons heating 10 lbs of grain to a strike temperature of 152 F
 - Results in 157 F infusion temp (no equip adjust)
- ▶ Rule of thumb here
 - Heat water to 4–7 F above your step temp
 - Works pretty well since we have a pretty high water to grain ratio

BIAB Myths



- ▶ Mashing with no sparge will hurt my efficiency
 - BIAB typically delivers very high efficiency
 - You can crush the grain finer (some double mill)
 - You're actually sparging the full boil volume the entire time you are mashing
 - The bag is a very efficient filter – thousands of holes over a very large surface area
 - The grains get compressed when you lift the bag out, delivering more wort

For all of the batches I've done to date, efficiency matches that of a traditional mash tun and slow sparge

BIAB Myths



- ▶ Mashing with twice as much water will hurt the conversion of starches
 - BIAB converts as well as a traditional mash
 - Myth arises from “theoretically” slower beta-amylase activity in the thinner mash
 - Thinner mashes actually produce more maltose (Noonan – “New Brewing Lager Beer”)
 - Germans have used very high water/grain ratios in traditional decoctions for hundreds of years
 - Their beer tastes just fine...and its malty!

BIAB Myths



- ▶ BIAB will result in a thinner beer body
 - Almost the opposite of previous myth...
 - Higher maltose production means more fermentable beer, with too dry a finish...

- Again not significant– just as with a regular mash you can manage beer body using mash temperature and ingredient selection

BIAB Myths



- ▶ Draining the bag released tannins and astringency (also clarity issues)
 - Astringency is driven by oversparging or sparging at too high a temperature (does not happen in BIAB)
 - Poor pH management can also cause astringency
 - Just as with traditional brewing
 - Some believe that squeezing grain bag somehow releases more grain tannins into the wort
 - Tannin flavors really driven by pH and temperature
 - Many commercial brewers use “hammer presses” to beat grains to a fine powder, yet no tannin/astringency

A Fancy BIAB (Like) System



Patent DE 101 50 395 B4

20 l and 50 l unit

- ▶ Braumeister (Speidel)
 - Single vessel system – both mash and boil
 - Electric heating element
 - Has large internal basket with holes for grains that works like our bag
 - Has internal pump and tube to recirculate mash for constant temperature
- ▶ Sizes up to 200 liters
 - (52 gallons)



Image from:
<http://www.speidels-braumeister.de>



Lessons Learned/Limitations

- ▶ Do need a larger boil pot than you might purchase just for boiling
- ▶ Can actually mill the grain a bit finer which will help your efficiency
 - Don't need to worry about a stuck sparge, as long as your grain bag is fine enough
 - Some people "double mill"
- ▶ Need to take some care in bag material selection and placement
 - I had one bag melt on the edge because of hot gasses from the propane heater coming up the side of the pot



BIAB Advantages

- ▶ Easy entry to all grain brewing
- ▶ Less equipment – one vessel
- ▶ Lower cost
- ▶ Time saving – cuts sparge step
- ▶ Less mess – one vessel to clean
- ▶ Beer tastes great– blind taste tests confirm this
- ▶ Good efficiency, good conversions
- ▶ Safer – you don't have to move any hot wort
- ▶ No stuck mashes (ever!)
- ▶ Can do multi-step mashes
 - Requires either direct heating the mash or a second vessel to heat a separate infusion

Thank You



▶ Resources:

- BeerSmith.com/Blog
 - Search for “BIAB” (podcast and blog)
- BIABrewer.info (forum)
- AussieHomeBrewer.com (forum)
- BeerSmithRecipes.com
 - Search for “BIAB”

▶ Questions?

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