Intro to Sake

Or, How Making Sake is Really Not All That Different From Brewing the Beer We Know And Love

By

Eddie Hoskin
But first…

Introduction time!

• Brewing since 2007
• First brewed sake in 2008
• BJCP rank of Certified
• Live in SW MI—beer, wine, and beaches
• Involved with 3 clubs: AABG, MEGA, and SWMBC
Overview

• Origins and History
• What equipment you’ll need
• Ingredients
• Process
• Q&A
“Sah-keh”

- Common misconception is to pronounce it as “Sah-ki”
- Original Japanese is:
  - 酒  ← Looks like a bottle!
  - さけ
  - Sa Ke
  - Sake!
- *Can refer generically to ‘alcohol’
History Lesson

• First written reference is 712 AD
• Originally controlled by government
• Brewed by monks for 500 years
• De-regulated and taxed—sake explodes
• Around 1900 homebrewing is outlawed
• During WW2, quality was cut
• Breweries have slowly been returning to quality
Equipment

• In summary, you’ll need:
• A fermenter
• A steamer
• Cheesecloth
• Stirring utensil
• Optional:
  – A cooler
  – A press
Fermenter

• Use a wide-mouth, non-plastic fermenter
• Fermenter minimum is ~1.6 times the batch size (round up to 2)
• Successful fermenters:
  – Crocks (i.e., pickling crock)
  – Stainless steel pots
  – Enamel pots
  – Newfangled wide-mouth carboys
Steamer

• You need a steamer, not a ‘cooker’
• ‘Pot-top’ bamboo steamers are inexpensive and good for small batches
Cheesecloth

- Makes cleanup easier
- Acts as a filter material when pressing the lees
Ingredients

• Rice! (duh)
• Koji
  – Pre-made koji
  – Koji spores
• Soft water
• Nutrients
• Yeast
Rice

• Traditionally, calls for polished rice
  – Expensive
  – Hard to find

• Practically, good dinner rice works well
  – Commonly available
  – Inexpensive
  – Brands: Nishiki, Calrose
Koji

- Rice doesn’t have Amylase enzymes…so we help it with Koji
- We use Koji that is maturing on rice
- Can be purchased (Cold Mountain) or grown from spores (Vision Brewing)
- Process discussed later
Water/Nutrients

• Like beer, sake is an acidic ferment. Use RO water if your home water is not good.
  – No Iron!!!
• Rice doesn’t have all the nutrients yeast need to be happy and healthy
  – Basic Yeast Nutrient
  – Lactic Acid (or blend)
  – Morton’s Salt Substitute
Yeast

• Sake goes to a very high alcohol, so using sake-specific yeasts is recommended
• Both White Labs and Wyeast make a fine product
Process Overview

• (Optional): growing your Koji-rice
• Making a yeast starter
• Feed the starter
• And again
• And again…. 
• And one more time
• Press the lees
• Age
• (Optional): Pasteurize
Koji Rice

• Buying Koji rice sure is convenient, but:
  – It’s expensive
  – It’s hard to find
  – If you can find it at a local store, great!
  – If not…..
Koji-Kin

• Time to grow your own!
  – Spores (Koji-kin) are readily available
  – Spores are shelf stable
  – Infinite supply
  – Cheaper than buying Koji-Rice
  – Just add rice! (Detour)
Steaming Rice

• Essentially identical process used several times through the sake cycle.
• Vary the amount you need for each step
• When making rice for Koji, make all the rice you’ll need for all the Koji at once
Wash the Rice

• Rice is covered with milling dust
  – One recipe for glue is rice and water
  – Cleaning this dust off simplifies cleaning later
• Put the rice in a bowl
• Run water over the rice
• Agitate with hand
• Done when water runs clear
• Takes ~5 minutes
Soak the Rice

• Steamed rice needs to be soaked before steaming
• Cover the rice with water and let it sit an hour
• Or, let it sit in the fridge overnight
Drain the Rice

• The goal is to get moisture to the center
• But NOT have a soggy outside
• Put the rice in a colander for an hour
Ready the Steamer

• Line the steamer with cheesecloth
  – Optional, but really helps with cleanup
• Layer the rice on
• If very deep, poke holes in the rice with a chop stick for ventilation
Steaming

• Put the steamer basket(s) on the pot
• Steam for 1 hour
• If using 2 layer steamer, switch at 40 minutes
• Rice is done when translucent
  – Not crunchy
  – May be somewhat firm still
Cooling the Rice

• Need to cool the rice and dry it out
• Traditionally done by spreading it out
  – A sanitized countertop works well
• If you have a smaller amount in the steamer, convection works well
Back to Koji

• So now we have our rice ready
• Put the rice in a wide container
• When temp hits 110°F, add the koji
  – Koji kin may be sprinkled directly on, or
  – Koji may be mixed with flour to thin it out
  – Goal is to get 1 spore on every grain of rice
    • Mix, sprinkle, mix, sprinkle etc
Keep it warm

• Put the koji container in a cooler
• The koji should be kept at ~90-95°F for 1st 24 hours
• Swapping in hot water bottles works
• Or, cheat like me and point a heater at it
• Or, get fancy and use a temperature controller
Keep Growin’, Koji!

• Stir the rice every 12 hours
  – Break up clumps!
• After the first 24 hours, the Koji will begin producing its own heat; adding heat may not be necessary.
• Will develop a ‘cheesy’ aroma
When is it done?

- We want Koji in its prime, before it decides to have toxic kids
- White mold should be evident on every/nearly every grain
- Cut a grain in half—mold should reach at least half way through
- Finished approx. 54 hours after starting
OH NO!

• Waited too long, and the rice went green?
  – No worries, you now have infinite koji!
  – Get a shaker bottle and put the green rice in
  – You now have a koji-kin factory in a bottle!
  – Just shake the bottle over steamed rice
  – Refresh with a little steamed rice every few batches.
  – Keep out of the light.
Cue the scary violins!
OK, I got Koji

- Divide it up into 4 lots
- Refrigeration is OK for use within a couple weeks
- Freezing is recommended for more than that
  - It won’t hurt the koji
Let’s get fermenting!

- Sake fermentation is very similar to a step-fed beer
- Start with a starter and feed it several times, about doubling each time
- Higher yeast cell concentration deters other microbes
- Slow feeding of sugars allows higher final alcohol
Starter

• Get your yeast warm (and smacked)
• Add the nutrients to the $\frac{1}{2}$ the water
  – Refrigerate/freeze the other half
• Add the 1$^{st}$ koji pack (we made and refrigerated earlier) to the water
• Add the yeast
Starter, Continued

- Steam the rice
- Cool the rice
- Add the cold/frozen water to the mash
- Add the mostly cool rice to the mash
- Ferment at ~72°F
Mind, Blown

- Fermenting rice will develop a ‘cap’
- The cap will dry out over time
- Less liquid, less yeast
- Less yeast, more baddies
- So, while your inner brewer instincts may scream for you to not do this...
Stir the mash

• Every 12 hours, to start.
• Pop it open and use a sanitized stirring implement to gently mix the cap under
• Yes, this will cause minor oxidation
  – Not that big a deal
  – Live with it
This is where we repeat

• The starter takes ~7 days to finish up.
• Each addition stage is essentially the same
• After 1\textsuperscript{st} addition, no less than 48 hours in between additions, no more than a week
• Each addition is approximately doubling the size
• Wash, rinse, repeat
Let’s review

- Starter: 1 week
- 1\textsuperscript{st} addition: 2-3 days later
- 2\textsuperscript{nd} addition: 2-3 days later
- 3\textsuperscript{rd} addition: 2-3 days later
- You get the idea
Each Addition in Summary

- Soak the rice
- Steam the rice
- Add the Koji
- Cool the rice
- Add the water
- Add the cooled rice
Keep stirring

• Don’t forget to stir every 12 hours
  – Can move to once a day after a couple days

• Fermentation temp is steadily cooler
  – Real world:
    • I keep the 1\textsuperscript{st} addition upstairs
    • Later additions I keep in my basement (60\textdegree F)
    • Temperature control is nice, but you can succeed without it
Primary Ferment

• After you add your last addition, you’re finally at your primary ferment
• Keep that stirring going, once ever 12 hours for the first 2 days and then once a day after that
• This ferment is long, slow, and cool
• Adds about 1% alcohol every day
Now for the messy part

• After 2-3 weeks, there should be a clear liquid layer before you stir
• If you’re taking hydrometer readings, levels have stabilized under 1.000
• It’s time to rack to secondary!
It’s mine, all mine!

• About half of the liquid sake goodness is locked up in the lees
• Traditionally, highest quality sake is make by bagging up the lees and hanging them
• But that’s inefficient, so we’ll be pressing the lees
Poor man’s press

- A nylon paint strainer and two strong hands.
  - Pour the lees into the strainer (in batches)
  - Squeeze the strainer until you aren’t getting any more
  - Not easy or terribly efficient, but it works!
I got a friend….

- A wine press works well for pressing sake
- I prefer metal ones to avoid contamination concerns
- Much more efficient than by hand
- Much easier than by hand
- Borrow one from a wine-making friend!
My New Friend

• Or, use this as an excuse to finally upgrade!
Secondary Ferment

• When you first transfer in, it will be milky
• Time will drop out the solids soon enough
• Rack when clear (~10 days)...and if desired
• Secondary is about a month
The Great Debate

• To pasteurize, or not to pasteurize?
  – Pasteurization serves to knock out baddies and stop enzymatic action
  – If you are not 100% confident of your sanitation practices, good thing to do
  – Coming from a beer brewer, I’ve had good luck with not pasteurizing
  – Alternatively, sake may be kept refrigerated
Pasteurizing

• Typically this is done twice—1 month after primary, and again immediately before bottling
• Rack into smaller jugs (1 gallon jugs or growlers) and heat the sake to 140-150ºF
• Let it cool to room temp before resealing or capping
Bottling

• Basically the same as with beer
• Backsweeten to taste, if desired
  – Must be either pasteurized or using campden and sorbate
Aging

• Sake greatly benefits from some time in the bottle
• Bottles will last for a few years, unless an infection got in
• Treat the bottles like beer or red wine—keep them in a cool, dark place
Serving

• May be hot, cold, or room temperature
• Traditionally served in small decanters and consumed in small cups
• Pro tip—serve hot sake side-by-side with cold beer; extremely refreshing!
Etiquette

• Drinking should be a social experience—drink sake with friends!
• It is improper to pour for yourself
• If you see a friend’s glass is empty….take care of that!
Q and A

• Comments? Questions? Personal Experiences?