



BLENDING AND POST-FERMENTATION ADJUSTMENTS FOR THE HOMEBREWER

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2015 NATIONAL HOMEBREWERS CONFERENCE

WHO'S THIS GUY?

NATIVE "HOOSIER"; RESIDE IN ST. LOUIS

HOMEBREWER

- Started Homebrewing in college (2007)
- Make/dump a lot of sour homebrew
- Presented on Mixed Fermentation at 2013 NHC
- BJCP Judge
- Member of STLHops homebrew club

ENGINEER

- Food & Beverage Industry Consulting
- Facility design, process, controls, packaging, water treatment, utilities



GOALS

FOCUS ON THE ART OF BREWING (LEFT BRAIN VS. RIGHT BRAIN)

PLAY 'CHEF' IN THE CELLAR

GIVE PRACTICAL/HELPFUL ADVICE FOR ALL EXPERIENCE LEVELS

DEMYSTIFY BLENDING: SHARE MY SUCCESSES, HIGHLIGHT SIMPLICITY

PUSH MORE BREWERS TOWARDS 'THE WILD SIDE'

MAKE BETTER BEER



WHAT ARE WE TALKING ABOUT, HERE?

POST-FERMENTATION ADJUSTMENTS

- Modest changes in overall impression at some time after fermentation is complete
- Final 'seasoning'
- Addition of ingredients that complement or add complexity: fruit, spices, etc.
- An iterative process that must also include tasting and evaluation

BLENDING

- Post-fermentation adjustment with beer used as an ingredient
- Creation of a new beer using two or more beers as raw ingredients



BLENDING AND ADJUSTMENT ARE NOT:

DIFFICULT TO MASTER ON THE HOMEBREW SCALE

ONLY FEASIBLE WITH FANCY EQUIPMENT AND/OR LOTS OF BEER

REQUIRED TO MAKE GREAT BEER

A 'FIX' FOR POORLY MADE BEER!



WHAT IS BAD BEER?

FERMENTATION OFF-FLAVORS

- Yeast stress compounds: unintended esters, phenols, fusel alcohols (age?)
- Acetaldehyde, diacetyl, under-attenuation
- Infection

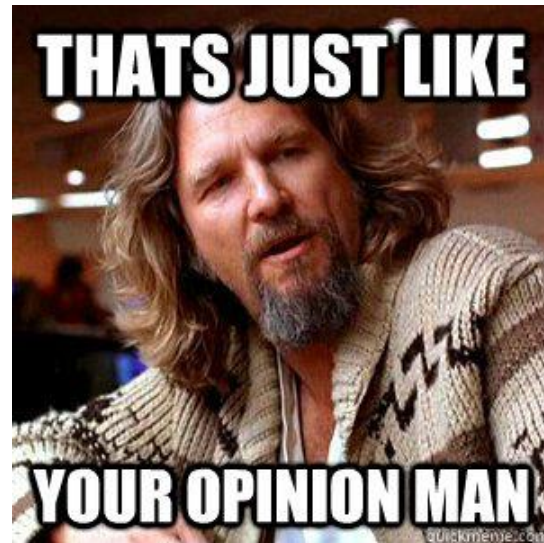
PROCESS ISSUES

- DMS
- Oxidation

INGREDIENTS ISSUES

- Stale, poor quality
- Water quality (chlorine)

OFF FLAVORS CAN BE MASKED – IS IT WORTH IT?



GOALS FOR ADJUSTMENT

HAVE AN END GOAL

- Competition: Closer to BJCP Style, 'refresh' aged beer
- Adding complexity
- Recipe development

CRITICAL EVALUATION

- Distraction-Free Tasting
- Take good notes
- Get help if needed

DON'T OVERDO IT!



DON'T OVERDO IT

SMALL, INCREMENTAL CHANGES WITH EVALUATION

SMALL BATCH TESTS

- Try it in the glass first!
- Think about proportion, intensity, & overall effect

ACCURATE CARBONATION IS IMPORTANT

CONSIDER EXPOSURE: OXYGEN, MICROBES, OIL

- Don't over-tweak
- Closed, purged transfers whenever possible
- If possible, wait to carbonate until after adjustments (CO₂ bite)
- Wear gloves!



ADJUSTMENT OPTIONS

BALANCE FLAVORS

ACCENTUATE FLAVORS

COMPLEMENT FLAVORS

ADD FLAVORS



BALANCE FLAVORS

BALANCING SWEETNESS

- Change perception of sweetness with carbonation
- Add sweetness (“back-sweeten”) with syrup, honey, lactose (keep cold, drink quickly)
- Balance sweetness with acidity

BALANCING ACIDITY

- Increase acidity by adding acid
 - Food-grade phosphoric, lactic, citric acid; powdered acid blend (wine, cider, mead)
 - Acidic fruit
 - Mixed secondary fermentation
- Add sweetness to reduce perception (back-sweeten)
- Neutralize with base (less control)
- Adjust carbonation (different perception from palate to palate?)



BALANCE FLAVORS (CONTINUED)

BALANCING BITTERNESS/ASTRINGENCY

- Decrease perception with sweetness??? (Usually not the answer – think DIPA)
- Decrease bitterness with conditioning
 - Settling of yeast and roast malt fines (reduce astringency, stabilize flavor profile)
 - Bitterness drop (also hop flavor/aroma)
- Increase perception of bitterness with gypsum
- Increase actual bitterness with isomerized extract (?)

BALANCING BODY AND MOUTHFEEL

- Consider overall effect
- Carbonation is critical (and sometimes all that needs adjusting)
- Increase body with maltodextrin



ACCENTUATE FLAVORS

THINK LIKE A CHEF

- Adjust 'seasoning' before service
- More is not always better (Not enough vs. too much salt)
- Brewing salts: Accentuate hop bitterness/flavor with Gypsum, malt flavor w/ CaCl_2
- Use a water chemistry calculator to figure additions (just like on brewday)

THINK LIKE A BAKER

- Add sub-threshold amounts of vanilla, coffee, or salt to accentuate chocolate

THINK LIKE A WINE/MEAD/CIDER MAKER, BARTENDER

- Accentuate fruit flavors with acid (fruit beer, witbier, saison)
- Accentuate body/mouthfeel with tannin (oak, tannin powder)



COMPLEMENT/ADD FLAVORS

THINK LIKE A CHEF!

- Proven flavor combinations in food *usually* translate well to beer
- Complement hop flavor/aroma with citrus peel, fresh herbs
- Add depth of flavor via caramelization whenever possible
 - Roast, grill, or flambé stone fruit (peaches, plums) and citrus
 - Toast spices and dried chiles

THINK LIKE A BAKER!

- Add dessert-like flavor to complement chocolate
 - Vanilla, coffee, or salt (more pronounced flavor from ingredient)
 - Cayenne or ancho chile
 - Fruit: Raspberries, cherries, orange





BLENDING BASICS

KNOW YOUR GOAL

START WITH GOOD BEER (GREAT BEER IS BETTER)

DON'T OVERTHINK IT

MINIMIZE OXYGEN PICKUP



BLENDING METHODS

USE BEER TO ADJUST (ACCENTUATE/COMPLEMENT/BALANCE)

- Small portion of ‘character’ beer added to base
- Typically, base beer is still the main flavor contributor after blend
- Can be used as a post-fermentation adjustment
- Commercial Examples: Ommegang Three Philosophers

BEER COMPOSITION

- Using beer as ingredients in a greater recipe.
- Typically more ‘character’ beer(s) contribution to finished flavor profile.
- May or may not use a single beer as the ‘base’ (best to start with a base).
- Commercial Examples: Gueuze, Bruery Mélange series, New Belgium Transatlantique Kriek



BLENDING EXAMPLES

SAME BATCH/RECIPE, DIFFERENT TREATMENTS

- Reserve a portion of Imperial Stout before aging in a bourbon barrel; blend back after aging to reduce whiskey/barrel flavor intensity
- Split IPA and dryhop with different hops, blend back to taste, record proportions

RECREATE HISTORICAL BEERS:

- Porter, Flanders Red/Brown

STYLE BLENDS

- Black & Tan, Vicarus Tripel Gueuze, FW Anniversary

FLAVOR COMBINATIONS NOT ATTAINABLE BEFORE FERMENTATION

- Blend a portion of young barleywine into an aged batch to refresh hop character
- Add acidity/depth to fresh saison with an aged sour beer



BLENDING CONSIDERATIONS

START ON A SMALL SCALE

- Practice in the glass with homebrew and/or commercial beer
- The more you practice and taste, the easier it is to conceptualize a final composition

KEEP IT SIMPLE

- Pick a 'Base' and adjust with another beer
- Don't get too hung up on measuring blend proportions; art can be messy.

SELECTING SOURCE BEERS

- Stable flavor profile: properly fermented, conditioned.
- Yeast attenuation, residual sugar
- Carbonation levels
- Flavor clashes: citrusy hops & roasty malt, acidity & bitterness
- Practical: how do I get one liquid into another?



PRACTICAL BLENDING – WORT TRANSFER

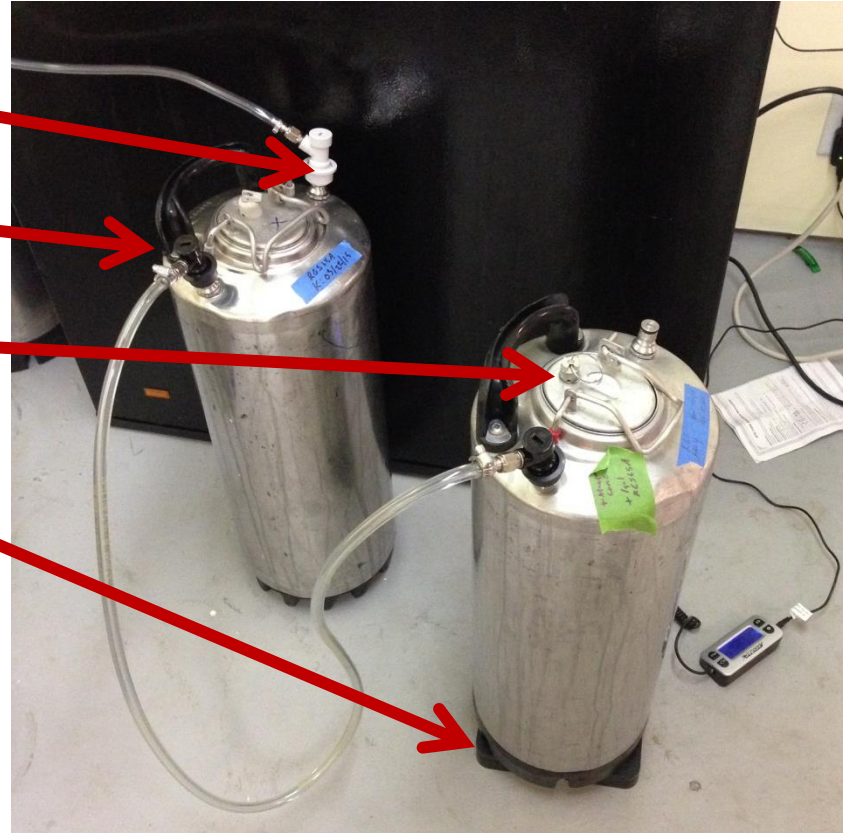
CO₂ into Source Keg

Out-Out Transfer Tube

Slowly bleed CO₂ from Blend Keg

Weigh blend keg with malt scale

Pro Tip: Record each keg's weight when empty.



PRACTICAL BLENDING – EASY MATH

My Recipes Weight-Vol ×

Weight to Volume

Calculates the volume in a container from its weight

Container Weight

Current Container Weight lb ●

Empty Container Weight lb ●

Specific Gravity SG ●

Estimated Volume

Estimated Volume gal ●

My Recipes Weight-Vol Dilution Tool Volume Units ×

Volume Units

Converts between different volume units

U.S. Volume Units		Metric Volume Units	
Fluid Ounces	<input type="text" value="67.63"/> fl oz ●	Milliliters	<input type="text" value="2000.0"/> ml ●
Cups	<input type="text" value="8.45"/> Cup ●	Liters	<input type="text" value="2.00"/> l ●
12 Ounce Bottles	<input type="text" value="5.64"/> 12 oz ●	Imperial Volume Units	
Pints	<input type="text" value="4.23"/> pt ●	Imperial Ounces	<input type="text" value="70.39"/> Imp oz ●
22 Ounce Bottles	<input type="text" value="3.07"/> 22 oz ●	Imperial Pints	<input type="text" value="3.52"/> Imp pt ●
Quarts	<input type="text" value="2.11"/> qt ●	Imperial Quarts	<input type="text" value="1.76"/> Imp qt ●
Gallons	<input type="text" value="0.53"/> gal ●	Imperial Gallons	<input type="text" value="0.44"/> Imp gal ●
Barrels (31 gal)	<input type="text" value="0.02"/> Barrel ●	Imperial Barrels	<input type="text" value="0.01"/> Imp Barrel ●



BeerSmith 2

$$\frac{\text{Current Keg Weight (lbs)} - \text{Empty Keg Weight (lbs)}}{8.34} = \text{Keg Volume (gallon)}$$



OTHER HELPFUL TOOLS



Wear GLOVES



PRACTICE MAKES PERFECT!

EXAMPLES (“WEEK NIGHT BLENDING”)

- Week Night Blending = an excuse to double-fist on a Wednesday (because SCIENCE)
- Mix packs: Samuel Adams “Pumpkintoberfest”, Sierra Nevada Torpedoweiss
- Petrus Aged Pale + Boulevard Ginger Lemon Radler
- Perennial Abraxas/Sump + La Boheme
- Firestone Walker Opal + Union Jack



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PRACTICAL - ADDING FRUIT

“FARM TO FACE”

- fresh vs. frozen vs. puree vs. canned vs. dried

PRACTICAL CONSIDERATIONS

- Fresh fruit floats: fill carboy to neck or use keg (or barrel)
- Make sure you can get the fruit out - small pieces, squeeze (expansion)
- Dried fruit: CHECK INGREDIENTS (no oil/sugar)
- In the keg? (YES!) – fine mesh bags, headspace for refermentation
- Great references: American Sour Beers, Experimental Brewing, Radical Brewing



PRACTICAL - ADDING SPICES

QUALITY IN = QUALITY OUT

ADDING SPICES DIRECTLY TO KEG/CARBOY

- Make sure you can get them out
- Use mesh bag, fishing line, bobber (?)

SPICE EXTRACTS

- Tincture – alcohol-based, homemade vs. pre-made
- Cold/hot extraction ('tea')

TASTE FIRST & OFTEN

- Make spices teas, add to sample of beer
- Taste keg daily if dry-spicing (over-spicing is very easy)
- Taste tinctures and watch for over-extraction (Cinnamon tincture, not Fireball)



BALANCE FLAVORS (CONTINUED)

DECREASE OVERALL INTENSITY

- Just Add Water!
- Chlorine-free, deaerated, carbonated water
- Tasty McDole's "Golf Beer"
- Jamil's "Shallow Grave" and "Half Cousin"

INCREASE OVERALL INTENSITY WITH FORTIFICATION: SHERRY, PORT, WINE

- Randy Mosher's "Port-Like" Beer
- Denny Conn's BVIP
- Michael Tonsmire's New Zealan' Saison
- Rich, fruit-forward red wine is a great counterpoint to dark sour beers



BLENDING – PRACTICAL EXAMPLE

EXAMPLE: *SAISON DU RARZ*

- Blend of fresh, hoppy saison with aged sour blond (2 years old)
- Batch 1 (2014 NHC): 90% Saison; 10% sour blond
- Batch 2 (Local Beer Festival): Added about 10% more sour blond to Batch 1 (80/20?)

PROCEDURE

- Tasted/evaluated saison brewed for NHC.
- Evaluation Result: well-brewed, hoppy, subtle yeast character, lacks bitterness
- Options: Leave it alone, Blend with IPA (no time), find substitute for bitterness
- Adjustment: Use aged sour beer to add acidity instead of bitterness, add depth/dryness
- Poured samples, tasted separately, blended in glass (accuracy could be improved)
- Using approx. blend ratio, transferred sour beer into saison keg, measured by weight





OR THE HOMEBREWER