



Beer Alchemy: Pre and Post Flavor Ideas

National Homebrew Conference 2009

Presented by Sean Z. Paxton

Abstract



- There is a set formulation of ingredients that work together in unison, to create a flavor profile that is categorized as a style of beer. Participants attending this session will explore the application of shared flavor profiles from the kitchen, home brewery and back bar to create unique and special blends such as cuvee's and other one-off beers we see Craft Brewers create today. Understanding each ingredient (malt, water, hops and yeast) and applying techniques used by the brewer, wine maker, distiller and mixologist, homebrewer's can design a recipe (pre and post fermentation) to become unique to our own tastes.

Outline



- Pre-fermentation: What can we do to add flavors
- Post-fermentation: Ideas in adding new flavors to beer
- Other Industries: Parallel thinking
- Inspirations: Thoughts on designing a beverage

Pre-fermentation: Malt

What can we do to add flavors



- Designing a beer recipe
 - Malt
 - Malty/Toffee/Caramel?
 - Roasty/Chocolate/Coffee/Espresso
 - Wheat/Rye
 - Different Adjuncts
 - Wild Rice/Black Rice
 - Buckwheat/Millet/Amaranth



Pre-fermentation: Sugars

What can we do to add flavors



- Designing a beer recipe
 - Sugar
 - Dextrose: Feeding a beer like DHF 120 IPA
 - Soft Sugars: Rochefort/Westmalle/Westvleteren
 - Candi Syrups
 - Different Sugars
 - Date Syrups
 - Jaggery/Palm Sugar
 - Mexican Cone Sugar
 - Turbinado Sugar



Pre-fermentation: Spices/Herbs

What can we do to add flavors



- Designing a beer recipe: Reflections on a Gruit
 - Spices
 - Coriander/Cumin/Peppercorns
 - Herbs
 - Thyme: Pannepot
 - Bay Leaf
 - Thai Basil: The Bruery Trade Winds

Pre-fermentation: Hops

What can we do to add flavors



- Designing a beer recipe
 - Hops
 - What does a hop bring to a beer?
 - Bitterness
 - Aroma
 - Flavor
 - What flavors do hops bring to the beverage?
 - Can we re-create the flavor of hops without hops?

Brian Hunt – Moonlight Brewing



Hop Oils

A world of flavors to offer



- Monoterpenoids

- Myrcene- Spicy
- Linalol- Floral
- Geraniol- Floral
- Limonene- Citrus, fruity
- Terpineol- Woody, resinous
- Pinene- Spicy, Piney
- Citral- Citrus
- Cadinene- Citrus
- Associated with fresh / non-oxidized dry hop aroma

- Sesquiterpenoids

- Humulene
- Caryophyllene
- Humulene epoxide
- When in oxidized form they are associated with “hoppy” “noble” aroma.

Slide courtesy of Matt Bryndilso

Flavor Components of Common Spices



Spice	Limonene	Pinene	Caryophyllene	Myrcene	Eugenol	Humulene	linalool
Annotto	x	x		x		x	
Basil	x				x		
Cardamom	x	x					x
Coriander	x	x					x
Grains of Paradise			x			x	x
Lemongrass	x						x
Rosemary		x		x			

Slide courtesy of Matt Bryndilso

Citrus Character

Terpenes Found in Citrus Fruit



Fruit	Limonene	Pinene	Geranial	Linalool	Sulfury	Notes
Orange	X	X	X	X	X	Complex aroma / many oil components
Grapefruit	X		X	X	X	meaty / sulfery component
Lemon	X	X				"rich and rounded" aroma when fermented
Lime	X	X				pine / floral / spicy

Slide courtesy of Matt Bryndilso

Classic “Grapefruit” Aroma



“Limonene by itself has no perceivable aroma in beer. Hydrogen Sulfide, produced by all yeast varieties during fermentation, bonds with limonene, a classic citrus-like component of hops, to form 1-p-menthen-8-thiol, which gives a distinct grapefruit aroma. Therefore the limonene content of hops may be a good indicator of grapefruit aroma intensity in the finished beer”

- *Sierra Nevada Brewing*

Company

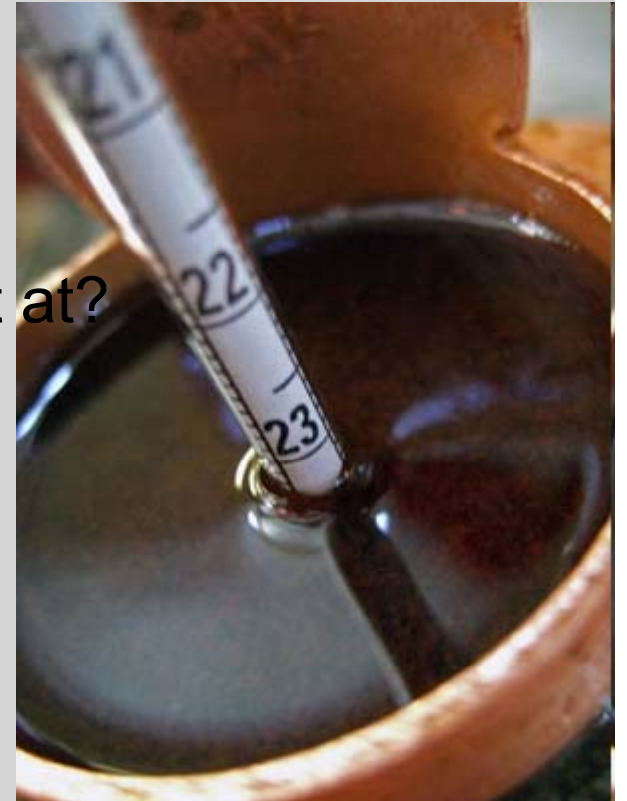
Slide courtesy of Matt Bryndilso

Pre-fermentation: Yeast

What can we do to add flavors



- Designing a beer recipe
 - Yeast
 - Ale vs Lager
 - What temperature does it ferment at?
 - Understanding Phenol and Esters
 - Wyeast 3787
 - Multiple Yeasts
 - Other Yeasts
 - Brett
 - Wine Yeast



Saucerful of Secrets:

Designing an Extreme Beer



OG: 1.094	FG: 1.020	ABV 9.7%	51.9 SRM	24.4 IBU		
Amount	Item				Type	% or IBU
6.00 lb	Castle Pilsner (2 Row) (2.0 SRM)				Grain	30.4 %
3.00 lb	Golden Promise, Maris Otter (3.0 SRM)				Grain	15.2 %
1.50 lb	Caramunich Malt (56.0 SRM)				Grain	7.6 %
1.50 lb	Caravienne Malt (22.0 SRM)				Grain	
1.00 lb	Wheat, Flaked (1.6 SRM)				Grain	5.1 %
1.00 lb	Date Sugar (3.0 SRM)				Adjunct	5.1 %
0.50 lb	Aromatic Malt (26.0 SRM)				Grain	2.5 %
0.25 lb	Special B Malt (180.0 SRM)				Grain	
1.00 oz	Styrian Goldings [5.40%]	(60 min)			Hops	11.2 IBU
0.50 oz	Amarillo [9.50%]	(30 min)			Hops	7.6 IBU
0.50 oz	Kent Goldings [5.90%]	(15 min)			Hops	2.7 IBU
1.00 tsp	Wyeast Yeast Nutrient	(15 min)			Misc	
2.00 items	Servomyces Yeast Nutrient	(15 min)			Misc	
1.00 lb	Candi Sugar, Blond (75.0 SRM)	(15 min)			Sugar	5.1 %
1.00 lb	Candi Sugar, Clear (0.5 SRM)	(15 min)			Sugar	5.1 %
1.00 lb	Candi Sugar, Dark (275.0 SRM)	(15 min)			Sugar	5.1 %
1.00 lb	Dark Rock Candi Syrup (500.0 SRM)	(15 min)			Sugar	5.1 %
1.00 lb	Turbinado (10.0 SRM)	(15 min)			Sugar	5.1 %
0.50 oz	Summit [15.40%]	(5 min)			Hops	2.9 IBU
2.00 gm	Seeds of Paradise	(5 min)			Misc	



Wine Makers:

Learning From Other Industries



- Designing a Wine:
 - What vessel for fermentation and aging
 - Size and surface area
 - Oak vs stainless steel
 - Type of wood
 - American Oak
 - French Oak
 - Hungarian Oak
 - Type of toast
 - Wine yeast
 - Fruit: Grapes/Rhubarb/Dandelions

Vinnie Cilurzo – Russian River Brewing Co.



Distillers:

Learning From Other Industries



- Designing a Spirit:
 - Base Recipe: What percentage or what fermentable
 - Potato, Rye, Wheat, Barley, Corn, Sugar Cane, Beet
 - Pot or Reflux still
 - Oak and Age
 - Type of wood
 - American Oak
 - French Oak
 - Hungarian Oak
 - Tequila/Bourbon/Scotch/Brandy/Ru



Bartenders and Cocktails:

Designing a Recipe



- Taking ideas from Mixologists:
 - Taking a combination of spirits, ice, juices, syrups and bitters
 - Approach: Thinking Like a Chef
 - What is in Season/What is Ripe
 - Sky is the Limit
 - Hickory and Apple Wood Smoked Pineapple Syrup
 - Add Tequila
 - Darjeeling Tea Cordial
 - Five-spice-infused Agave Nectar
 - Think Mescal
 - Gastrique Syrup
 - Think Brut
 - Beer Cocktails – Berliner Weisse with Woodruff Syrup

The Art of the Chef



- Taking an ingredient
- Overlaying an idea/theme/concept/memory
- Applying technique and experimenting
- Adjusting the flavors
 - Bitter/Sweet/Sour/Salty
 - Citrus/Acid
 - Spice
 - Herb



Blending



- Firestone Walker 10, 11, 12
 - Involving winemakers
 - A little goes a long way

Belgian Lambic & Gueuze Production



- Belgian brewers were known to purchase light ale or lager from other brewers to dilute and/or stretch their Lambics
- Like-wise, ale brewers were know to purchase Lambic for blending to bring tartness to some products
- Gueuze is typically a blend of different ages
 - Old blended with young

Slide courtesy of Matt Bryndilso

Blending Strategies



- Pick a theme
 - Sweet / Acidic / Malty / Hoppy / ...etc
- Start with two beers and find a solid foundation
- Utilize additional components to add highlights to the foundational beer
- Go back and recreate blends before you make the real blend
- Get other's opinions – this is a team sport!

Slide courtesy of Matt Bryndilso

Homebrewing Blending Ideas



Create a Blending Cellar

- Hold back portions of your beers
- Practice the Party Gyle method when brewing big beers
- Basement refrigerator or open top cooler
- Cornelius kegs
- Purge well
- Oak chips
- Keep cool

Make Blend Trials

- Graduated cylinder and a note pad
- Play with commercial examples
- Keep good records
- Brew beers that compliment each other
- Blend by weight

Slide courtesy of Matt Bryndilso

Inspirations:

Thoughts on designing a beverage



- 23 years old Wheat Whiskey Barrel
 - What to do with it?
 - Creation of Old Pappy

Inspirations:

Thoughts on designing a beverage



- Wit beer with Passion fruit
- Feeding a beer Different sugars, like DFH 120, but using a different base beer
- Beer Port
- “Cacao Nibbing”
- Candied Lemongrass Saison

Elixir



elix·ir

Pronunciation: \i-`lik-sər\

Function: *noun*

a sweetened liquid usually containing alcohol that is used in medication either for its medicinal ingredients or as a flavoring

Spiced Port Elixir



Ingredients:

1	Half Gallon	Mason Jar
1	Bottle	Port, Warre's OTIMA 10 year old Tawny Porto (Oak Cask) 20%, 500ml
1	Ounce	French Oak, Medium Toast cubes
2	Each	Tahitian Vanilla Beans, cut lengthwise
1	Each	Mexican Vanilla Bean, cut lengthwise
8	Ounces	Dried Figs, stems removed, cut into quarters
1	Each	Cinnamon Stick
2	Each	Star Anise, whole

Directions:

Add all ingredients to the mason jar, seal, store in a cool, dark place for at least 2 weeks – 1 year.

Late Harvest Elixir



Ingredients:

1	quart	Mason Jar
375	ml	Pacific Rim Vin de Glacière Riesling
60	gram	Dried Mango
40	gram	Dried Papaya
40	gram	Dried Bartlett Pear
10	gram	Dried Apricot

Directions:

Add all ingredients to the mason jar, seal, store in a cool, dark place for at least 2 weeks – 1 year.

Vanilla French Oak Bourbon Maple Syrup Elixir



Ingredients:

1	Ounce	French Oak, medium toast, cubes
1	Ounce	Bourbon
3	Each	Vanilla Beans, sliced open and seeds removed
750	ML	Maple Syrup, Grade b, 100%

Directions:

Preheat oven to 300°

Take French Oak chips at place on a baking dish and cook for 30 minutes in the oven. Remove from the oven when the time is finished, add to a mason jar and add shot of your favorite bourbon, 3 vanilla beans sliced in half length wise (2 Tahitian and 1 Mexican) and top with 100% pure Maple Syrup. Let sit at room temp for 2 weeks and taste.

Makes 2 375ml Bottles

Other Ideas



- e•lix•r tonic and teas products
 - Morning After Tonic with A Belgian Blonde
 - Chi Devil with a Saison
 - Virtual Buddha with a Amarillo IPA
 - Mighty Joe Yang with Oatmeal Stout
- Bitters – used in cocktails, why not beer?
- Port, Vermouth, Late Harvest Wines, Ice Wines
- Liqueurs
 - Chocolate Oatmeal Stout with Godiva
 - Kailua Espresso Imperial Stout
 - Grand Marnier Double Wit

Additional Information



- This talk can be found at www.homebrewchef.com
 - Additional video's
 - More recipes
 - Links
- Beer, Beer and More Beer
 - Homebrew Chef Beer Kit on the way

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- Brian Mercer Dark Candi
- Radny Mosher Radical Brewing
- Nate Smith Homebrew Fanatic
- Jamil Zainasheff The Godfather

Backup Slides



Essential Oils Found in Hops



- 0.5-1.5% by weight
- Hydrocarbons
 - Most volatile (thus very aromatic)
- Oxygenated Compounds
 - Associated with “noble” aroma
 - Esters
- Sulfur Containing Compounds
- Hop flavor is a result of synergistic mixture of these compounds

Slide courtesy of Matt Bryndilso

Solera Port Tradition



- Each bottling includes a blend of many vintages
- Enough of the old vintages are held back to be included in future blends
- As time passes the complexity of the releases increases

Slide courtesy of Matt Bryndilso

Firestone Walker

Double Barrel Ale



- Classic British Pale Ale recipe
- 4-6 brews are blended into a single stainless fermenting vessel
- At 24hrs into the fermentation (high krausen) a portion of the fermenting wort (20%) is moved into individual new American oak barrels
- The beer ferments in these barrels for 7 days while the balance of the brew finishes fermenting in stainless
- The beer is blended back together after cold side maturation at 15-20% oak / 80-85% stainless.
- The resulting flavor can not be replicated any other way!

Slide courtesy of Matt Bryndilso

Blending Notes



- Hop driven styles did not benefit from oak aging
- Malt driven styles were preferred and were the center point of the blend
- English Style Barley Wine became the corner stone of the blend
- Imperial Stout added nice complexity and chocolate notes in small percentages
- No single beer had a cherry or stone fruit note but once blended – that flavor became evident and was a focal point for the final blend
- A sour beer could be integrated into the program for future blends

Slide courtesy of Matt Bryndilso

The Inspiration



- Firestone Walker's oak brewing tradition and our connection with winemaking
- Barrels Utilized:
 - Old Fitzgerald Bourbon
 - Old Fitzgerald Wheat Whiskey
 - Heaven Hill Bourbon
 - Heaven Hill Brandy
 - New American Oak
 - Retired Firestone Union Barrels (American Oak)

Slide courtesy of Matt Bryndilso