Hard Seltzers Made Easy

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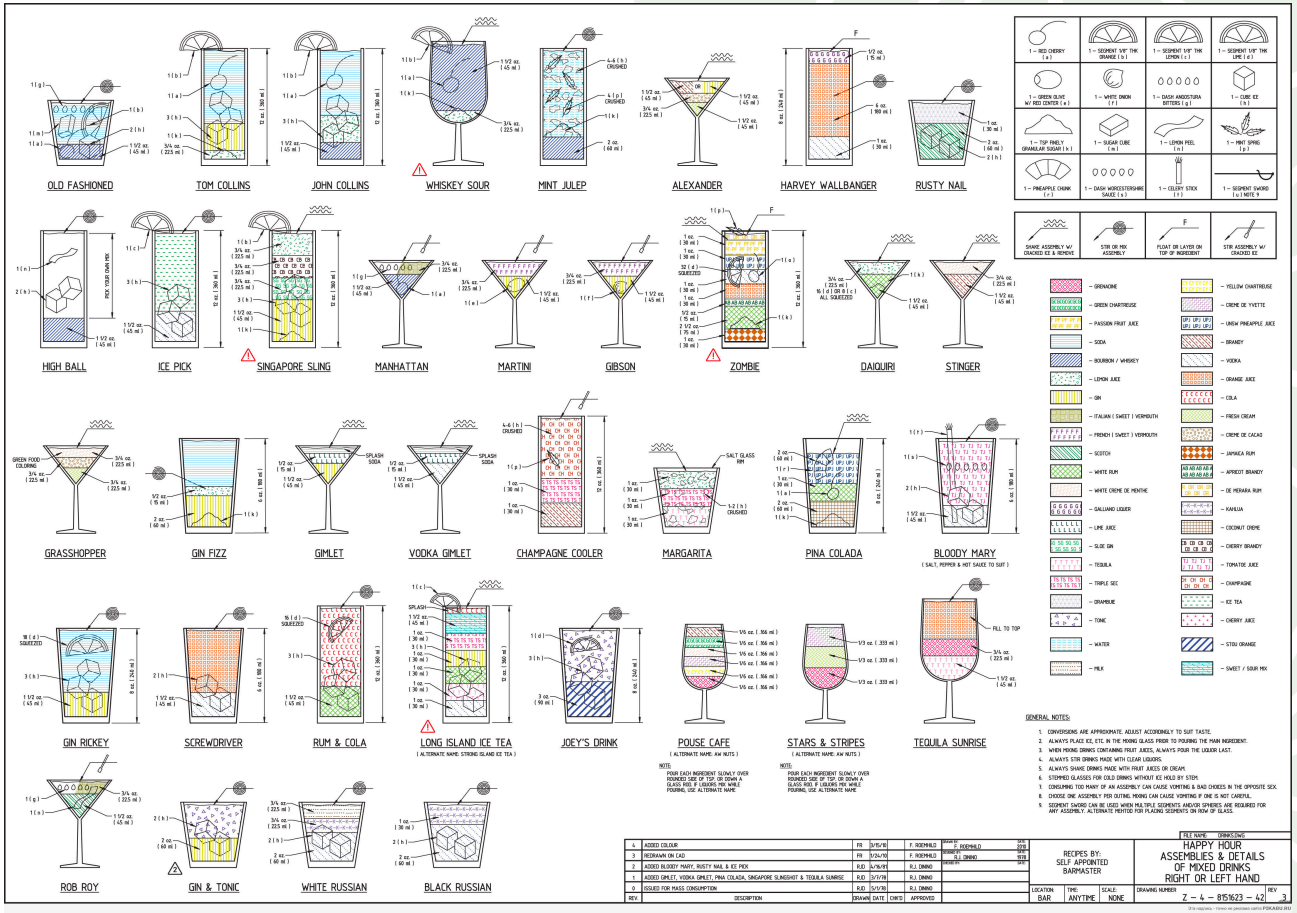
Technical Chair – MBAA District Great Plains

- Started homebrewing in 1986
- BS in Food Science from Virginia Tech in 1991
- MS in Food/Brewing Science from UC Davis in 1994
- Joined BYO Team in 1995
- Paul Mueller Company 1997-2016
- BSG 2016 - Present

Today's Agenda

- Review the seltzer-making process while discussing some of the lessons learned over the last 18 months.
- Leave you with practical information that can be used in your operation.
- Have some fun!



The Basic Cocktail

Water

Alcohol (distilled)

Sugar (sometimes)

Acid

Flavor (Aroma + Taste)

Sometimes Color

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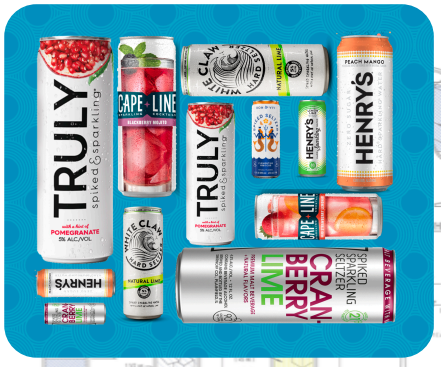

Seltzer ≅ Cocktail

Water

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Flavor (Aroma + Taste)

Sometimes Color

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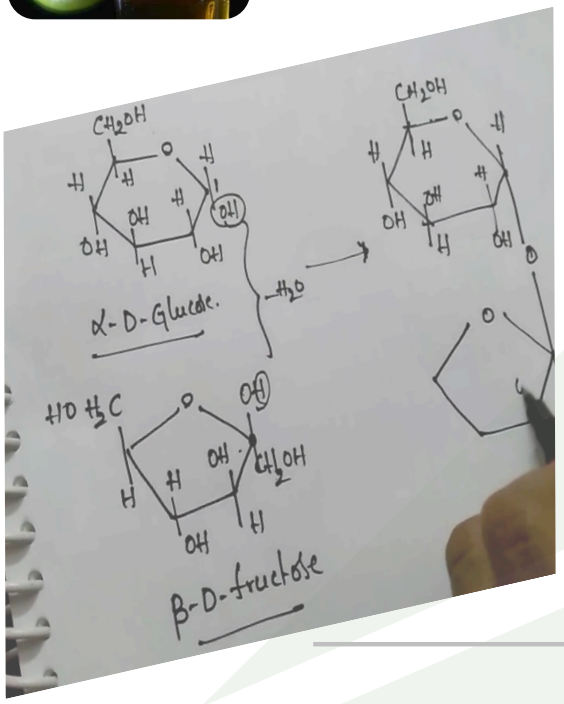
Fermentables

- sucrose, dextrose, candi, and invert sugars
- honey, agave nectar
- cider base, fruit juices
- malt, malt extracts



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The objectives?

- Convert sugar to ethanol
- Minimize residual flavor
- Little to no residual extract
- Clarity ... perhaps

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What Brewers Know About Water?

- Influences mash pH, hop utilization, wort color, and lots other brewing variables
- May contain flavor-active solutes
- Hard Seltzers are about 95% water

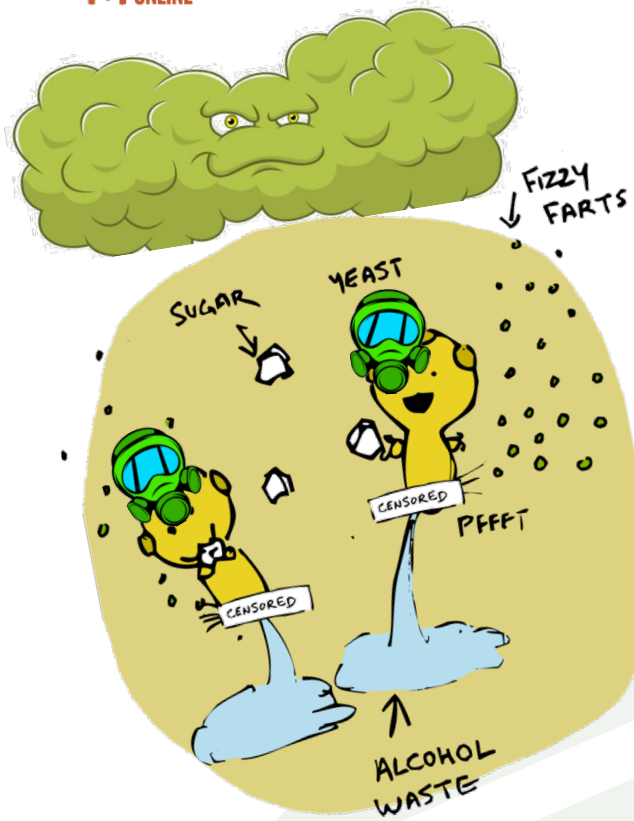
Seltzer Water Suggestions

- Don’t need to worry about brewing chemistry

- Flavor is important ... Charcoal filtration and RO treatment are commonly used to prepare water for bottled water, soft drinks, and hard seltzers (max alkalinity of ~40 ppm as $CaCO_3$)

- Flavoring salts can be added late in the process to tweak flavor balance

Let's Talk About Yeast



- Champagne Yeast (PDM)
- Ale Strains (US-05)
- Distiller's Yeast
- Special Seltzer Yeast
- Clean fermentations are not easy ... **failure can lead to off-aromas**

Let’s Talk About Yeast

- Champagne Yeast (PDM)
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- Special Seltzer Yeast
- Clean fermentations are not easy ... **failure can lead to off-aromas and congeners**

Keep it Clean!

- The secret to success
- The risk of “dirty” fermentations is real when using nutrient-poor substrates

The objective is to start with a clean base to build upon. The base is not the final product.

Photo Credit: Nauti Seltzer, Wachusett Brewing

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Nutrients Are Key

Bench trial yeast nutrients to determine the proper rate of addition for your product and process.

NUTRIENT ADDITION CHARTS

SUPERFOOD, SUPERFERM, CIDERFERM & STARTUP

Lower Brix grapes need less nitrogen, higher Brix grapes need more

CHOOSE ONE of the blends: Use Moderate Risk Chart if you cannot test YAN. Add Vitamix or Vitamix+ at Stage 1.

NOTE: EXPORT BLENDS USE THE SAME DOSING AS DOMESTIC BLENDS

VERY HIGH RISK
Initial YAN 50 ppm
(or 100 ppm YAN@25+Brix)
Select your blend

	Stage One Addition Inoculation #/1000G (ppm)	Stage Two Addition Active Fermentation #/1000G (ppm)	Stage Three Addition Mid Fermentation ~10 -12 Brix #/1000G (ppm)	
SUPERFERM	Superferm: 2 # DAP: 2 #	Superferm: 2 # DAP: 2 #	Superferm: 1 # DAP: 2 #	Total Add Superferm: 5 # (600 ppm) YAN 48 ppm Total Add DAP: 6 # (725 ppm) YAN 154 ppm
SUPERFOOD	Superfood: 2 # DAP: 1.5 #	Superfood: 2 # DAP: 2 #	Superfood: 1 # DAP: 2 #	Total Add Superfood: 5 # (600 ppm) YAN 57 ppm Total Add DAP: 5.5 # (650 ppm) YAN 138 ppm
STARTUP	Startup: 2 # DAP: 2 #	Startup: 1 # DAP: 3 #	Startup: 1 # DAP: 2 #	Total Add Startup: 4# (500 ppm) YAN 20 ppm Total Add DAP: 7# (840 ppm) YAN 178 ppm

(CIDERFERM NOT RECOMMENDED AT THIS RISK LEVEL)

HIGH RISK
Initial YAN 100 ppm
(or 150 ppm YAN@25+Brix)
Select your blend

SUPERFERM	Superferm: 2 # DAP: 1 #	Superferm: 1 # DAP: 1.5 #	Superferm: 1 # DAP: 2 #	Total Add Superferm: 4 # (500 ppm) YAN 38 ppm Total Add DAP: 4.5 # (550 ppm) YAN 117 ppm
SUPERFOOD	Superfood: 2 # DAP: 0 #	Superfood: 1 # DAP: 2 #	Superfood: 1 # DAP: 2 #	Total Add Superfood: 4 # (500 ppm) YAN 45 ppm Total Add DAP: 4 # (500 ppm) YAN 106 ppm
CIDERFERM	Ciderferm: 2 # DAP: 0 #	Ciderferm: 1 # DAP: 1.75 #	Ciderferm: 1 # DAP: 2 #	Total Add Ciderferm: 4 # (YAN 500 ppm) YAN 57 ppm Total Add DAP: 3.75 # (YAN 450 ppm) YAN 96 ppm
STARTUP	Startup: 2 # DAP: 1 #	Startup: 0 # DAP: 2 #	Startup: 1 # DAP: 2.5 #	Total Add Startup: 3 # (350 ppm) YAN 15 ppm Total Add DAP: 5.5 # (650 ppm) YAN 138 ppm

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Starting to sound like a science project?

... Slow ...

$$$ Expensive $$$

Resource vacuum

Two Suggested Paths

... Set Menu ...

Yeast + nutrient blend

... Build Your Own ...

Clean Yeast Strain

Special Nutrient Blend

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Special Seltzer Yeasts

Clean Yeast Strain
+ Nutrient Blend
--
Designed for Neutrality
-

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TY•PURE

A high purity active dried yeast formulated with optimized nutrition for fermentation of neutral flavour washes from pure sugar up to 14 % ABV.

PATHFINDER INGREDIENTS

PRODUCT DESCRIPTION AND FUNCTION

TY-Pure is based on a low-congener, non-diastatic active dried yeast producing minimal fusel oils, esters and other fermentation by-products, therefore minimizing contribution to flavour and aroma characteristics of the end product. TY-Pure is formulated with optimized nutrition for rapid and reliable fermentation of neutral flavour washes up to 14 % ABV from highly refined sugar substrates, but can be used with any fermentable sugar substrate to yield alcohol for use in a variety of applications.

TY-Pure contains a chemically defined nutrient complex optimized for neutral character alcohol base for beverage applications including FMB/CMB hard sodas and seltzers. TY-Pure can also be used for distillation of spirit alcohol from a variety of substrates. The nutrient complex in TY-Pure contains all the essential macro and micro nutrients required for healthy fermentation, including nitrogen (urea-free source), phosphate, magnesium, B vitamins and trace minerals.

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N-PURE

SELTZER NUTRIENT

PATHFINDER INGREDIENTS

Overview

- One example of a complete nutrient complex especially developed for fermenting refined sugar solutions for use in making hard seltzers.

What are these nutrients?

- A chemically-defined, complete nutrient, providing all essential macro and micro-nutrients required for fermentation of refined sugars.

- N-Pure Seltzer Nutrient can be used to ferment across a wide range of alcohol levels, allowing the brewer to select their own yeast strain according to their specific requirements.

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N-PURE

SELTZER NUTRIENT

PATHFINDER INGREDIENTS

Benefits

- N-Pure Seltzer Nutrient delivers Turbo Yeast nutrients without the yeast, and allows brewers the flexibility of strain selection and dosage to pitch ratios.

- Staged additions not required, making this easier for user.

- **C**ompared to yeast-derived nutrient products, N-Pure Seltzer provides a more complete nutrient profile (less chance of stuck fermentations) and won't taint wash quality with yeasty off-flavours.

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SELTZER NUTRIENT

PATHFINDER INGREDIENTS

Coming Soon!

- Samples will be available in mid-March
- Product available for purchase in early-to-mid May
- Pack sizes are 1 kg, 10 kg, and 25 kg

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Fermentation Basics

Vessel Types: can ferment in typical beer or wine fermentation vessel.

Temperature: varies with yeast strain, but it is important to note that cooler fermentations do not necessarily equate to cleaner ferment. In particular, SO_2 production is favored by cooler fermentation temps for a given yeast strain.

Yeast Cropping: not a common practice. Trials needed if used.

VDK Rest: as with beer, brewers should keep an eye on VDK and acetaldehyde reduction with seltzer fermentations.

Sensory: things may still be a bit rough at the end of fermentation.

Clarification Needs

Depth Filtration or Centrifuge: brewery should have clarification equipment if clarity is required because fining alone is often not sufficient for brilliance ...

Clarification Options

Silicic Acid: works with most brewing yeast strains and some seltzer yeast

Isinglass: definitely effective, but a significant slice of the target demographic may not accept

Chitosan: works in conjunction with silicic acid to remove hard-to-fine yeast strains

Carbon ... Why?

- Adsorb (trap) flavor-active compounds such as sulfurs, phenols, and higher alcohols
- Remove compounds that contribute color
- Neutral bases are nearly impossible without distillation, but activated carbon makes this realistic for brewers

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Carbon Options

Powdered carbon - add to fermenter after yeast removal to adsorb compounds from liquid ... dusty and messy

Carbon impregnated filter sheets – filter clarified seltzer base to remove color and flavor ... easy to use with sheet filter chassis

Carbon Options

Lenticular carbon elements - filter clarified seltzer base to remove color and flavor

- Easy to use with lenticular housing
- Compact footprint
- Lowest capital investment of clarification methods requiring equipment

Building Upon the Base

Acids

Citric | Malic | Lactic | Tartaric

Preservation

Sorbate | Metabisulfite

Filtration | Pasteurization

Fruit Purees & Crystals

Citrus | Berries | Tropical Fruits | Etc.

Aroma Extracts

Grapefruit | Lemon

Lime | Mango | Orange

Pineapple | Vanilla

“Forrest Gump is my inspiration for the future of seltzer with his monologue about shrimp variants. There will surely be cloudy seltzer, kettle-soured seltzer, barrel-aged seltzer, nitro coffee seltzer, Imperial seltzer, triple-double seltzer, PB&J seltzer, zero IBU seltzer, CBD seltzer, herbal seltzer, herbed seltzer, spiced seltzer, high-calorie, gluten-unfriendly, pastry seltzer, and even peach-mint, orange-hued seltzer. The sky is the limit and homebrewers will certainly be searching for the outer limits. Have fun with this style and don’t take things too seriously.” A. Lewis, December, 2019

Seltzers are not going away any time soon